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Ministry of Labor and Skills

Hardware and Networking Service

Level II

Based on March, 2022, Curriculum Version I



Module Title: Applying Problem – Solving Techniques to Routine Malfunction

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Table of Contents

Contents

Acknowledgement ..... - 2 -

Acronyms ..... - 5 -

UNIT ONE: IDENTIFY PROBLEMS ..... - 7 -

1.1 Identifying Hardware, software, user or procedural problem ..... - 8 -

1.1.1 Overview of Problems ..... - 8 -

1.1.2 Hardware problems ..... - 8 -

1.1.3 Software related problems ..... - 9 -

1.1.4 User related problems or procedural problems ..... - 10 -

1.2 Defining and determining Problems ..... - 13 -

1.2.1 General computer problem troubleshooting guide ..... - 13 -

1.3 Identifying and documenting condition of Hardware, software, user and problem ..... - 15 -

1.3.1 Introduction ..... - 15 -

1.3.2 Documenting Problems ..... - 17 -

Operation Sheet – 1 ..... - 21 -

Lap Test ..... - 23 -

Unit Two: Determine fundamental / root causes of the problem ..... - 25 -

2. Identifying possible causes ..... - 26 -

2.1 Determining the fundamental causes of the problems ..... - 26 -

2.2 Developing possible cause statement 31

2.2.1 Introduction 31

2.2.2 The Six Step Problem Solving Model 31

2.3 Identifying fundamental causes and conducting investigation 38

2.3.1 Common Solutions for common problems 38

Operation Sheet-2 45

Lap Test 48

Unit Three: Recommend solutions to problem 50

3.Identifying potential solution to problem 51

3.1 Introduction 51

3.1.1. An Unresponsive PC 51
3.1.2. Monitor Troubleshooting 52
3.1.3. The screen is too bright or too dark 52
3.1.4. The screen is shaking 53
3.1.5. Printer Troubleshooting 53
3.1.6. The printer is printing streaks on the page 55
3.1.7. CD Troubleshooting 56
3.1.8. Keyboard Troubleshooting 56
3.1.9. Mouse Troubleshooting 57
3.1.10. Networking Troubleshooting 57
3.1.11. Video/Screen Troubleshooting 58
3.1.12. Sound Troubleshooting 60
3.1.13. Startup Troubleshooting 61
3.1.14. Hard Drive Troubleshooting 62
3.2 Recommendation about possible solutions 64
3.2.1 Developing/Ranking alternatives 64
3.3 Planning Implementation and evaluation of solutions 67
3.3.1. Develop a plan for implementation 67
3.3.2 Monitoring/Evaluating progress 67
3.4 Documenting and submitting recommended solutions 68
3.4.1 Documenting system problems and symptoms 68
Documentation standards 68
3.4.2 Document the process. 68
Operation Sheet-3 71
Lap Test 73
Unit Four: Participate in Workplace Communication 76
4. Communication Media 77
4.1 Types of communication medium 77
Reference 84

Acronyms

LAP-Learning Activity Performance

SLA-Service Level Agreement

OH&S-Occupational Health and Safety

FAQs-Frequently Ask Questions

PC-Personal Computer

CMOS-Complementary Metallic Oxide Semiconductor

SOP-Standard Operational Procedure

E-Mail-Electronic mail

BIOS-Basic Input Output System

Introduction to the Module

This module defines the competence required to apply problem solving techniques to determine the origin and plan for the resolution of à routine malfunction.

Module units

- Identify problems
- Fundamental / root causes of the problem
- Solutions to problem
- Workplace Communication

Learning objectives of the Module

At the end of this session, the trainee will able to:

- Identify and analyze problems
- Determine fundamental / root causes of the problem
- Recommend solutions to problem
- Participate in Workplace Communication

Module Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks
5. Perform Operation Sheets
6. Do the “LAP test”

UNIT ONE: IDENTIFY PROBLEMS

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identifying Hardware, software, user or procedural problem to appropriate person
- Defining and determining Problems
- Identifying and documenting condition of Hardware, software, and user problems

This guide will also assist you to attain the learning outcome stated above. Specifically, upon completion of this module, you will be able to:

- Identifying Hardware, software, user or procedural problem areas to appropriate person in the organization
- Defining and determining problems to be investigated are
- Identifying and documenting current conditions of the hardware, software, user and problems are objectively

1.1 Identifying Hardware, software, user or procedural problem

1.1.1 Overview of Problems

- **Definitions**
  - ✓ **Problem** - is any challenge that hinders us from attaining our objectives; or it may tackle and reduces our performance of doing our daily activities. Since we are Information Technology technicians, we may face many technical problems in our day to day activities.
  - ✓ **Routine problems** – are computer problems that happen intermittently again and again and we are familiar with.
  - ✓ Routine problems are easy to solve

A problem sometimes can be as simple as restarting your computer to solve but sometimes it may take many steps and processes, it may need to break into small and manageable formats (divide and conquer rule) so that we can solve easily.

Identifying problem is the first step in problem solving that is why it is said that "Identified problem is equal to solved problem". Once we identify the problem, it will be easy for us to find the solution.

In order to identify computer related problems, we need to categorize problem areas as follows:

- Hardware related problems
- Software related problems
- User or Procedure related problems

1.1.2 Hardware problems

Problems in the hardware area cover the hard components of the computer; the power supply, the motherboard, the memory chips, the CPU, the CPU sink, the various cards and parts that make up the actual physical presence of the computer may crush or problem of incompatibility.

Because the first thing a computer does when it is turned on is check out its hardware, issues in this area tend to show up immediately upon powering up.

However, sometimes hardware issues don't show up until the computer has been running for a while. If that happens, the cause of the problem will have something to do with the computer overheating and the heat causing the malfunction.

Hardware fault-finding checklist

Here's a useful checklist that you can use to help you diagnose faults in hardware.

- ✓ First, consult any service level agreements (SLA) to ascertain if or clarify response time obligations and internal/external responsibilities. Determine also if there are there any other organisational guidelines you need to follow.
- ✓ Consult documentation logged from previous related or similar situations. Determine a set of questions can you ask the user, your colleagues and your supervisor that might assist you in finding a solution.
- ✓ Remember to keep safety as your highest priority by observing OH&S precautions, that is, ensure your own safety first, and then consider other precautions such as static discharge, etc.
- ✓ Check the power supply. Ensure it is working and that it is powering the motherboard.
- ✓ If no video is displayed try swapping the monitor with a known good one.
- ✓ If the video controller is built in, disable it and try another known working video card. To disable the built-in video controller, you will need to access the system CMOS or BIOS setup. On some systems, simply inserting a new video card will automatically disable the built-in video.
- ✓ Remove all expansion cards. If the machine boots, replace the cards one by one until the problem reappears.
- ✓ Check the CPU fan is operating.
- ✓ Check the RAM chips by swapping them with known good ones.
- ✓ Check the motherboard for signs of blown components.
- ✓ If still no success, you might swap the entire motherboard and CPU.

Remember to document everything you do according to organisational guidelines.

1.1.3 Software related problems

Operating system for our purpose here, the operating system we will look at is Windows 7. Problems with Windows 7 usually arise when some process or event has corrupted or deleted settings or files that Windows depends upon to run smoothly.

At the core level, the method that Windows uses to track what is installed and removed is through the Windows registry. This registry file is quite often the source of Windows problems.

You might see errors about **dll** files missing, or **cab** files being overwritten, or you might see that Windows just won't start, or it will start, but then crash with the "blue screen of death", a not so happy term for the blue screen that is associated with Windows physical memory dumps.

Application software related problems - application issues are the main cause of most computer problems. There are so many different software programs, all written in different code; all trying to talk to each other and work together without having conflicts. Inevitably, just as in human interactions, there are conflicts, and these can cause overall computer issues.

The best way to avoid these types of problems is to:

- ✓ Keep track of what you install on your computer.
- ✓ Watch how your computer behaves after you install a new program.

If your computer begins to slow down or act strangely, you can troubleshoot the issue by uninstalling that program and seeing if the problem is resolved.

That's really the best way to view computer troubleshooting. Know your computer, and keep track of anything new you do with it. Then when a problem shows up, ask yourself, **"Since the last time my computer was working fine, what changes were made?"** In this way, you can quickly narrow down the possible causes to the most likely culprit.

1.1.4 User related problems or procedural problems

The most commonly used methods to identify problems in dealing computer problem troubleshooting are collecting information from user/customer and computer itself.

Collecting Information

A well-defined problem really is half the solution. Something magical happens when you write down precisely what is wrong. Just collecting the symptoms triggers your brain to start searching for causes. As a bonus, if you write down the problem it will prepare you for other strategies.

I. Interview – is the best strategy to identify what problems the user/customer regarding the problem at hand is the most common and fastest way of getting information.

The followings are some of the questions one need to mention during the interview.

- ✓ What has been changed recently?
- ✓ Has anyone added a new program recently?
- ✓ Which programs are affected? Which programs are working still properly?
- ✓ Which components are dead, which components still work?
- ✓ Has any hardware changed?' If so reverse engines, revert to how it was and check if that cures the problem. Pattern recognition is a vital troubleshooting skill.

- ✓ What can you see that causes you to think there's a problem?
- ✓ Where is it happening?
- ✓ How is it happening?
- ✓ When is it happening?
- ✓ Why is it happening

II. Looking at computer symptoms – there are many helpful error codes, beep sounds, symptoms shown by our computer which help us to determine what the problem is, how to troubleshoot etc.

- ✓ Error codes displayed on screen, shown in device manager, event viewer etc
- ✓ Listen beep sound codes

III. Using your sense organs

- ✓ Smelling to identify for burnt components if any
- ✓ visual inspection - Looking Light emitting diodes (LED) for NIC, HDD, CD-ROM, etc, burnt components also can be identified by visual inspection, swollen parts releasing fluid like capacitors etc
- ✓ Watch the user while he/she is performing or using computer, so that we can identify procedural or user related problems.
- ✓ Ask the user to reproduce the problem? Can you make the fault reoccur? If so, write down any error messages and type them into search engines like google.com
- ✓ Ask the user/customer to show you the steps or process he/she performs to do what she/he wants the computer to do so that you can determine whether the problem is procedural or other.

These are the most important process that we can go through to can arrive at decision whether the problem is related to hardware, software, procedural, or user related by analyzing the information collected from the user and computer.

In all cases where you are trying to troubleshoot a problem, you need to use a **logical step-by-step approach and go from simple to complex.** For example, two questions that you would always ask in this situation are:

A. When did the problem begin?
B. Has any new hardware or software been added between the times that the problem appeared and when the system was last working correctly?

Here is a list of reasons why a computer might hang each time a specific software application is run.

It could indicate:

C. A corrupted file,
D. An incorrect installation,
E. Hard disk failure,
F. A virus,
G. A new application causing conflict,
H. New hardware causing conflict,
I. New device drivers causing a conflict with older software.

1.2 Defining and determining Problems

1.2.1 General computer problem troubleshooting guide

Here's a general troubleshooting guide that you can use when a computer develops a fault.

1. Don't fear.
2. Observe:
    - What are the symptoms?
    - What conditions existed at the time of failure?
    - What actions were in progress?
    - What program was running?
    - What was displayed on the screen?
    - Was there an error message?
    - What functions are still working?
3. Use your senses (sight, hearing, smell and touch).
    - Is there any odour present?
    - Does any part of the system feel hot?
4. Check power supply:
    - Is the plug inserted snugly into the computer?
    - Is the power cord plugged into an appropriate wall power outlet?
    - Is the wall power outlet working?
5. Documentation (fill in a pre-designed check list):
    - What is the computer doing?
    - What is the computer not doing?
    - What is being displayed on the screen?
    - Is there any error message?
    - What is still operating with everything connected?
    - Is power still operating on each part of a computer?
6. Assume one problem:
    - Use correct data and resources
    - Use relevant technical manuals and information

7. Use proper test equipment.
8. Isolate units one-by-one:
    - If a system worked when all peripherals were disconnected, turn power off and reconnect one of the peripherals. Power on and test. If that unit works, turn the power off and reconnect another peripheral. Again, power up and test. Follow this procedure until a unit fails.
9. Consult your index of symptoms:
    - Using your logbook, help desk database, or any relevant flow charts in reference books and manuals.
10. Localise to a stage.
11. Isolate to the failed part.
12. Test and verify proper operation.

After diagnosing and rectifying the fault, you need to document it in the log book or help desk database for future reference.

1.3 Identifying and documenting condition of Hardware, software, user and problem

1.3.1 Introduction

Preventive maintenance is a regular and systematic inspection, cleaning, and replacement of worn parts, materials, and systems. Preventive maintenance helps to prevent failure of parts, materials, and systems by ensuring that they are in good working order.

Troubleshooting is a systematic approach to locating the cause of a fault in a computer system. A good preventive maintenance program helps minimize failures.

- With fewer failures, there is less troubleshooting to do, thus saving an organization time and money. Preventive maintenance can also include upgrading certain hardware or software such as a hard drive that is making noise, upgrading memory that is insufficient, or installing software updates for security or reliability.
- Troubleshooting is a learned skill. Not all troubleshooting processes are the same, and technicians tend to refine their troubleshooting skills based on knowledge and personal experience. Use the guidelines in this chapter as a starting point to help develop your troubleshooting skills. Although each situation is different, the process described in this chapter will help you to determine your course of action when you are trying to solve a technical problem for a customer

Preventive maintenance reduces the probability of hardware or software problems by systematically and periodically checking hardware and software to ensure proper operation.

Hardware

Check the condition of cables, components, and peripherals. Clean components to reduce the likelihood of overheating. Repair or replace any components that show signs of damage or excessive wear.

Use the following tasks as a guide to create a hardware maintenance program:

- Remove dust from fan intakes.
- Remove dust from the power supply.
- Remove dust from components inside the computer.
- Clean the mouse and keyboard.
- Check and secure loose cables.

Software

Verify that installed software is current. Follow the policies of the organization when installing security updates, operating system updates, and program updates. Many organizations do not allow updates until extensive testing has been completed. This testing is done to confirm that the update will not cause problems with the operating system and software.

Use the tasks listed as a guide to create a software maintenance schedule that fits the needs of your computer equipment:

- Review security updates.
- Review software updates.
- Review driver updates.
- Update virus definition files.
- Scan for viruses and spyware.
- Remove unwanted programs
- Scan hard drives for errors.
- Defragment hard drives.

Be proactive in computer equipment maintenance and data protection. By performing regular maintenance routines, you can reduce potential hardware and software problems. Regular maintenance routines reduce computer downtime and repair costs.

During the troubleshooting process, gather as much information from the customer as possible. The customer should provide you with the basic facts about the problem. Here is a list of some of the important information to gather from the customer:

- **Customer information**
  - ✓ Company name
  - ✓ Contact name
  - ✓ Address
  - ✓ Phone number
- **Computer configuration**
  - ✓ Manufacturer and model
  - ✓ Operating system information
  - ✓ Network environment
  - ✓ Connection type
- **Description of problem**
  - ✓ Using Open-ended questions
  - ✓ Using Closed-ended questions

1.3.2 Documenting Problems

Document the information obtained from the customer in the work order and in the repair book. Write down anything that you think might be important for you or another technician. Often, the small details can lead to the solution of a difficult or complicated problem. **It is now time to verify the customer's description of the problem by gathering data from the computer.**

After you have determined the exact cause of the problem, establish a plan of action to resolve the problem and implement the solution. Sometimes quick procedures can determine the exact cause of the problem or even correct the problem.

If a quick procedure does not correct the problem, you might need to research the problem further to establish the exact cause.

When researching possible solutions for a problem, use the following sources of information:

- Your own problem-solving experience
- Other technicians
- Internet search
- Newsgroups
- Manufacturer FAQs
- Computer manuals
- Device manuals
- Online forums
- Technical website

Document Findings, Actions, and Outcomes

Finish the troubleshooting process by closing with the customer. Communicate the problem and the solution to the customer verbally and in writing. If possible, demonstrate how your solution has solved the problem. Be sure to complete the documentation, which should include the following information:

- Description of the problem
- Steps to resolve the problem
- Components used in the repair

Self-Check 1

Name: _____ Date: _____

Instruction*:* Answer all the questions listed below, if you have some difficulty doing this self-check, feel free to ask your teacher for clarifications.

Choose the correct answer

_____ 1. _____ are computer problems that happen intermittently again and again and we are familiar with.

A. Diagnosis B. Routine problems C. Faults D. None

_____ 2. If in windows 7 dll and cab files are corrupted, what type of problems is this?

A. User related B. Hardware Related C. Software Related D. All

_____ 3. Identify problems by smelling for burnt components will be done by _____

A. Using sense organ B. Conducting Interview C. Using Multi-meter

Write True or False

_____ 4. In all cases where you are trying to troubleshoot a problem, you need to use a logical step-by-step approach and go from simple to complex.

_____ 5. Routine problems are computer problems that happen intermittently again and again and we are familiar with.

Self-Check 2

Name: _____ Date: _____

Instruction*:* Answer all the questions listed below, if you have some difficulty doing this self-check; feel free to ask your teacher for clarifications.

Short Answer: Give a short and precise answer for the following question.

1. Observe is a general troubleshooting guide, to identify problems, which you can use when a computer develops a fault. What are the things that you need to observe?

✓ _____

✓ _____

- ✓ _____
- ✓ _____
- ✓ _____
- ✓ _____
- ✓ _____

Self-Check 3

Name: _____ Date: _____

Instruction: Answer all the questions listed below, if you have some difficulty doing this self-check, feel free to ask your teacher for clarifications.

True/False: Write True or False.

_____1. Troubleshooting is a regular and systematic inspection, cleaning, and replacement of worn parts, materials, and systems.

_____2. A good preventive maintenance program helps minimize failures.

_____3. All troubleshooting processes are the same, and technicians tend to refine their troubleshooting skills based on knowledge and personal experience.

_____4. Preventive maintenance reduces the probability of hardware or software problems by systematically and periodically checking hardware and software to ensure proper operation.

_____5. Removing dust from components inside the computer needs to be considered as a guide to create a hardware maintenance program.

_____6. Removing unwanted programs can be considered as a guide to create a hardware maintenance program.

_____7. Document the information obtained from the customer in the work order and in the repair book.

_____8. After determining the exact cause of the problem, the next step is to establish a plan of action to resolve the problem and implement the solution.

_____9. Use your own problem-solving experience can be considered as a source of information when researching possible solutions for a problem.

_____10. When completing the troubleshooting it is necessary to communicate the problem and the solution to the customer verbally and in writing.

Operation Sheet – 1

Operation title: -Identifying Problems

Purpose: -to check the system event viewer

Required tools and equipment: - Computer and peripheral

Instruction: -When system, user, or software errors occur on a computer, Event Viewer is updated with information about the errors. The Event Viewer application shown in Figure 1.1 records the following information about the problem:

- ✓ What problem occurred
- ✓ Date and time of the problem
- ✓ Severity of the problem
- ✓ Source of the problem
- ✓ Event ID number
- ✓ Which user was logged in when the problem occurred?

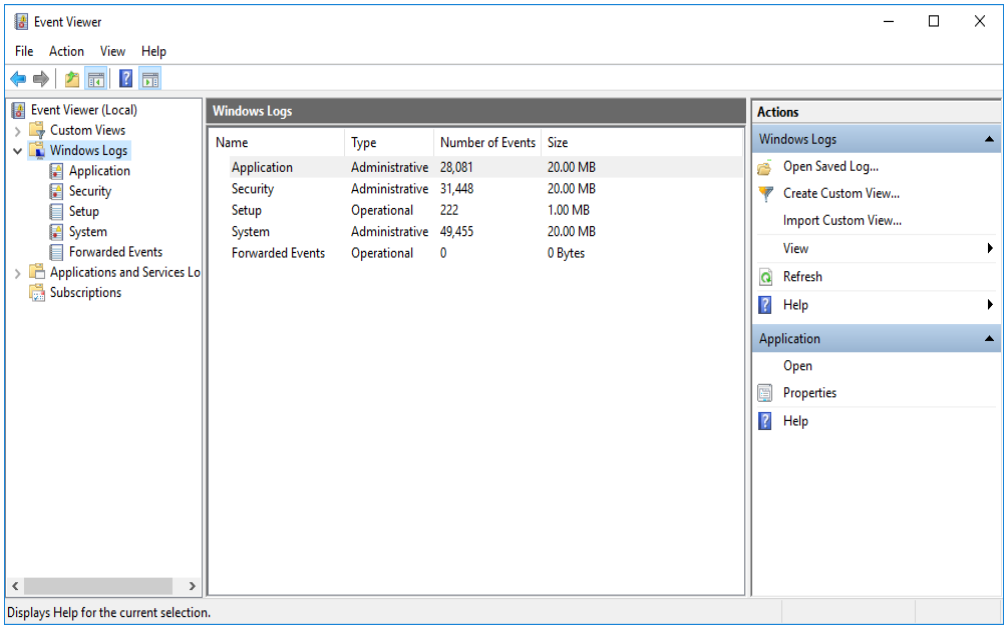


Fig. 1.1 Event Viewer

Although Event Viewer lists details about the error, you might need to further research the solution.

To open Event Viewer:

- ✓ **Click Start → Control Panel → Administrative Tools → Event Viewer**

Device Manager

Device Manager, shown in Figure 1.2, displays all of the devices that are configured on a computer. Any device that the operating system determines to be acting incorrectly is flagged with an error icon.

- This type of error has a yellow circle with an exclamation point (!).
- If a device is disabled, it is flagged with a red circle and an (?).
- A yellow question mark (?) indicates that the hardware is not functioning properly because the system does not know which driver to install for the hardware.

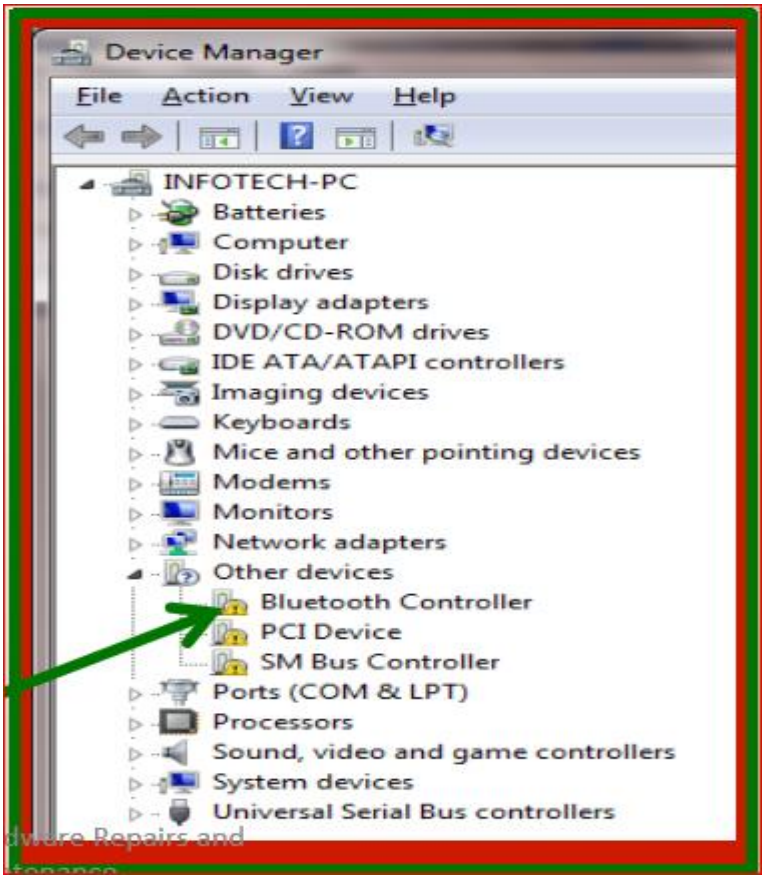


Fig. 1.2 Device Manager

To open Device Manager:

- ✓ **Click Start → Control Panel → Administrative Tools → Computer Management**
- ✓ **A new dialog box will appear.**
- ✓ **Then Click Device manager from the new dialog box at the right panel**

Lap Test	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: You are required to perform the following individually with the presence of your teacher. Please ask your trainer for the instructions for this lap test.

Activity 1: Follow the steps showed in “operation sheet 1, 1.1. Event Viewer” to view the Event viewer and try to identify if there are problems listed in it.

Activity 1: Follow the steps showed in “operation sheet 1, 1.3. Device manager” to view the device manager and try to identify if there are any devices having problems listed in it.

Answer Sheet-Unit One

Self-Check 1	1. B 2. C 3. A 4. True 5. True
Self-Check 2	✓ What are the symptoms? ✓ What conditions existed at the time of failure? ✓ What actions were in progress? ✓ What program was running? ✓ What was displayed on the screen? ✓ Was there an error message? ✓ What functions are still working?
Self-Check 3	1. False 2. True 3. False 4. True 5. True 6. False 7. True 8. True 9. True 10. True

Unit Two: Determine fundamental / root causes of the problem

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identifying possible causes
- Developing possible cause statement
- Identifying fundamental causes and conducting investigation

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this module, you will be able to:

- Identifying possible causes based on experience and the use of diagnostic tools and analytical techniques.
- Developing possible cause statements based on findings
- Identifying fundamental causes per results of diagnosis and investigation conducted.

2. Identifying possible causes

2.1 Determining the fundamental causes of the problems

The most frequently used method of identifying causes of computer problems are still gathering additional information. You may achieve it by:

- Getting input from other people who notice the problem and who are affected by it.
- Collect input from other individuals one at a time
- Use diagnostic tools
- Write down what your opinions and what you've heard from others.
- Seek advice from a peer or your supervisor in order to verify your impression of the problem.
- Write down a description of the cause of the problem and in terms of what is happening, where, when, how, with whom and why.
- Search Microsoft Knowledgebase databases for common computer problem causes
- Search Internet

- **Potential causes of damage to computer hardware and software**

Cause	Description	Damage	Recommendation
Temperature variations	Temperature variations (expansion and contraction of components from temperature change) can lead to serious problems.	• Chip creep — where the heating and cooling of components can cause movement, usually out of the socket that holds the component. • Signal traces on circuit boards can be cracked and separated. • Solder joints can be broken. • Contacts undergo accelerated corrosion. • Solid-state components can be damaged. • Read and write problems on hard disk drive (due to expansion and contraction of the platter of hard disk the data may be written at a different location relative to the track centre).	• Ensure a computer operates in correct ambient temperature Refer to the computer User's Manual for this information. • Ensure the ambient temperature when the: ✓ System is **on** it is in the range of **15-32 °C.** ✓ System is **off** it is in the range of **10-40 °C**.
Power cycling	Turning on a cold computer subjects it to the greatest possible internal temperature variation.	• Same as for temperature variation	• Power on a computer only once daily if there is stable power line. Don't turn a computer on and off several

			times every day.

There are a number of common causes of damage to a computer or its components. These are:

Static electricity	This problem usually appears during winter months when humidity is low, or in extremely dry climates where the humidity is low year-round. Some static-sensitivity problems are caused by improper grounding of computer power.	• Electronic components	• Always use a three-prong, grounded power cord plugged into a properly grounded outlet. You could use an outlet tester to check that it is properly grounded, but today, OH&S requires that all power equipment be properly tested and certified. This includes the outlets, cables and connectors. • Use a grounded static mat underneath a computer, or an antistatic wrist-strap, before touching internal components of the computer.
Power line noise	This problem is caused by poor quality power being supplied to a computer system, which creates some spikes and transients (short	• All system components	• A computer system should be on its own circuit with its own circuit breaker. • A three-wire circuit is a necessity.

	transient signals of sometimes 1000 volts or more). It can also be caused by sharing a power source with other higher power consuming equipment, such as coffee makers, copy machines or a laser printer. The wire size and length will affect the resistance of a power circuit.		• To decrease resistance, avoid extension cords unless absolutely necessary and then use only heavy-duty extension cords. • Avoid using too many items on a single outlet. • Add an Uninterruptible Power Supply (UPS) as a power conditioner.
Radio frequency interference	Mobile phones, cordless phones, fax machines and any radio transmission equipment.	• Sporadic random keystrokes will appear, as though an invisible entity were typing on the keyboard • White spots and lines appear on the screen	• Install specially shielded cables (built-in toroid core cables) outside a system unit.
Phosphor burn on a monitor	The phosphor on a cathode ray tube can be burned if a stationary image is left on a screen continuously for long time.	• Reduces the life of monitor (cathode ray tube)	• Turn both brightness and contrast levels to the minimum. • Use a screensaver that displays different patterns on a screen.
Dust and pollutants	A power supply fan carries airborne particles through a computer. Food crumbs are attracted by magnetic media, while cigarette ash	• Floppy disk heads and media • Electronic components (dust on the surface of components prevents	• Use power supply unit with air filter (the filter must be cleaned and changed periodically). • Don’t operate an unprotected

	and smoke are drawn toward disk drives.	necessary heat loss)	computer in a dusty environment, eg. an industrial workshop.
Water	On a desktop, coffee or tea spills over a keyboard or into a monitor.	• Keyboard malfunction • Monitor explosion (if a monitor is on)	• Never eat, drink or smoke inside a computer room.

2.2 Developing possible cause statement

2.2.1 Introduction

Problem solving is the act of defining a problem; determining the cause of the problem; identifying, prioritizing, and selecting alternatives for a solution; and implementing a solution.

2.2.2 The Six Step Problem Solving Model

Problem solving models are used to address the many challenges that arise in the workplace. While many people regularly solve problems, there are a range of different approaches that can be used to find a solution.

Complex challenges for teams, working groups and boards etc., are usually solved more quickly by using a shared, collaborative, and systematic approach to problem solving.

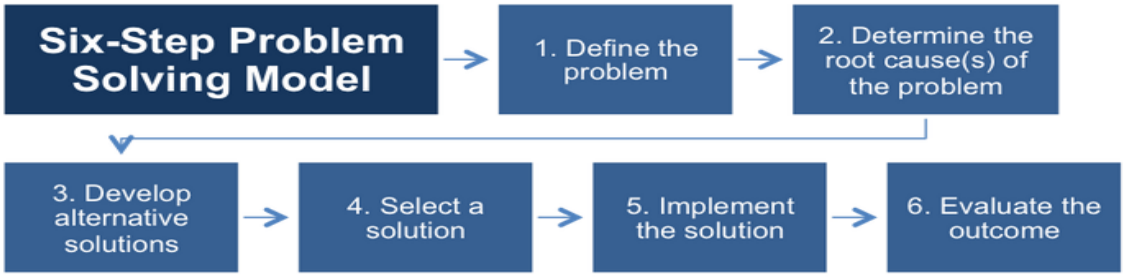
Advantages

The Six-Step method provides a focused procedure for the problem solving (PS) group.

- It ensures consistency, as everyone understands the approach to be used.
- By using data, it helps eliminate bias and preconceptions, leading to greater objectivity.
- It helps to remove divisions and encourages collaborative working.
- It stops PS groups diverging into different problems.
- It also helps PS groups reach consensus
- It eliminates the confusion caused when people use different problem-solving techniques on the same issue.
- It makes the decision-making process easier.
- It provides a justifiable solution.

All six steps are followed in order – as a cycle, beginning with “1. Identify the Problem.” Each step must be completed before moving on to the next step.

The steps are repeatable. At any point the group can return to an earlier step, and proceed from there. For example, once the real problem is identified – using “2. Determine the Root Cause(s) of the Problem”, the group may return to the first step to redefine the problem.

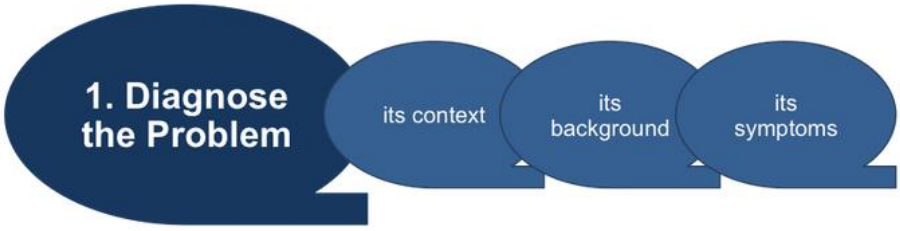


The Six Steps

1. Define the Problem
2. Determine the Root Cause(s) of the Problem
3. Develop Alternative Solutions
4. Select a Solution
5. Implement the Solution
6. Evaluate the Outcome

Step One: Define the Problem

Step one is about diagnosing the problem – the context, background and symptoms of the issue. Once the group has a clear understanding of what the problem is, they investigate the wider symptoms to discover the implications of the problem, who it affects, and how urgent/important it is to resolve the symptoms.



At this stage groups will use techniques such as:

- Brainstorming
- Interviewing
- Questionnaires

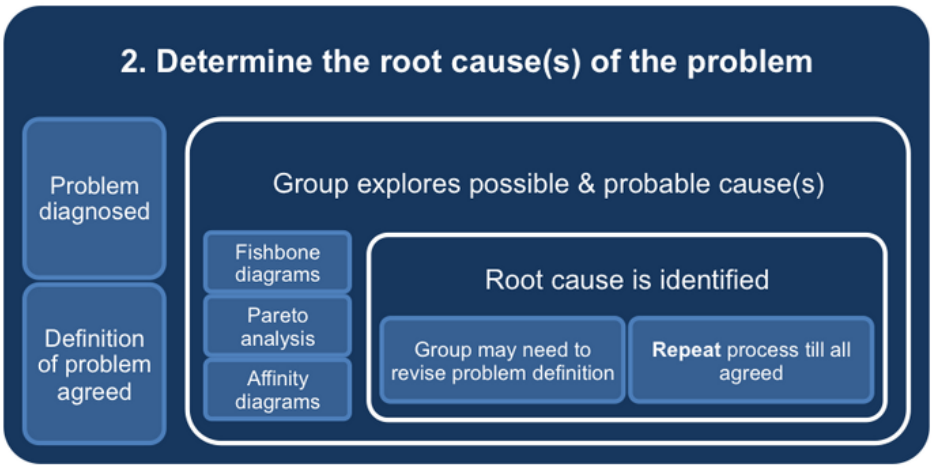
As this step continues, the PS group will constantly revise the definition of the problem. As more symptoms are found, it clarifies what the real problem is.

Step Two: Determine the Root Cause(s) of the Problem

Once all the symptoms are found and the problem diagnosed and an initial definition agreed, the PS group begins to explore what has caused the problem. In this step the problem-solving team will use tools such as:

- Fishbone diagrams
- Pareto analysis
- Affinity diagrams

These techniques help collect the information in a structured way, and focus in on the underlying causes of the problem. This is called the root cause.

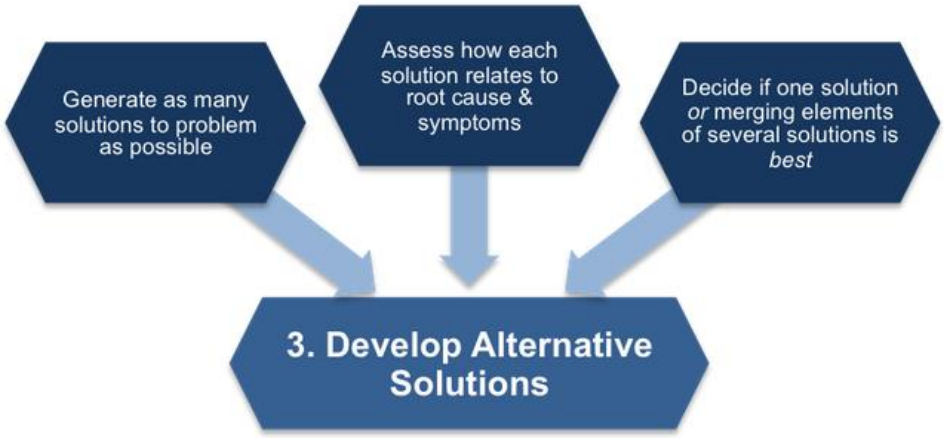


At this stage, the group may return to step one to revise the definition of the problem.

Step Three: Develop Alternative Solutions

Analytical, creative problem solving is about creating a variety of solutions, not just one. Often the most obvious answer is not the most effective solution to the problem. The PS group focuses on:

- Finding as many solutions to the problem, no matter how outlandish they may seem.
- Looking at how each solution relates to the root cause and symptoms of the problem.
- Deciding if different solutions can be merged to give a better answer to the problem.

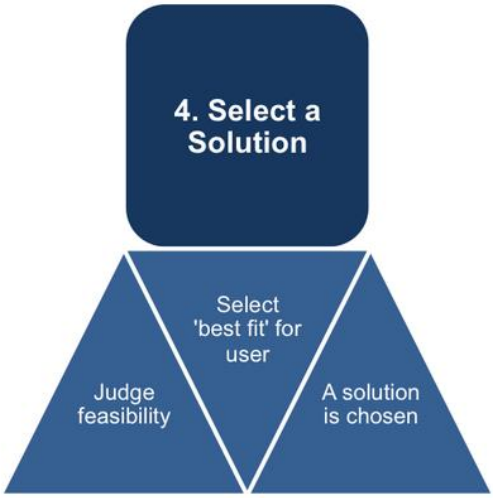


At this stage it is not about finding one solution, but eliminating the options that will prove less effective at dealing with both the symptoms and the root cause.

Step Four: Select a Solution

In the fourth step, groups evaluate all the selected, potential solutions, and narrow it down to one. This step applies two key questions.

1. *Which solution is most feasible?*
2. *Which solution is favored by those who will implement and use it?*



Feasibility is ascertained by deciding if a solution:

- Can be implemented within an acceptable timeframe?
- Is cost effective, reliable and realistic?
- Will make resource usage more effective?
- Can adapt to conditions as they evolve and change?

- Its risks are manageable?
- Will benefit the organization?

Which solution is favored?

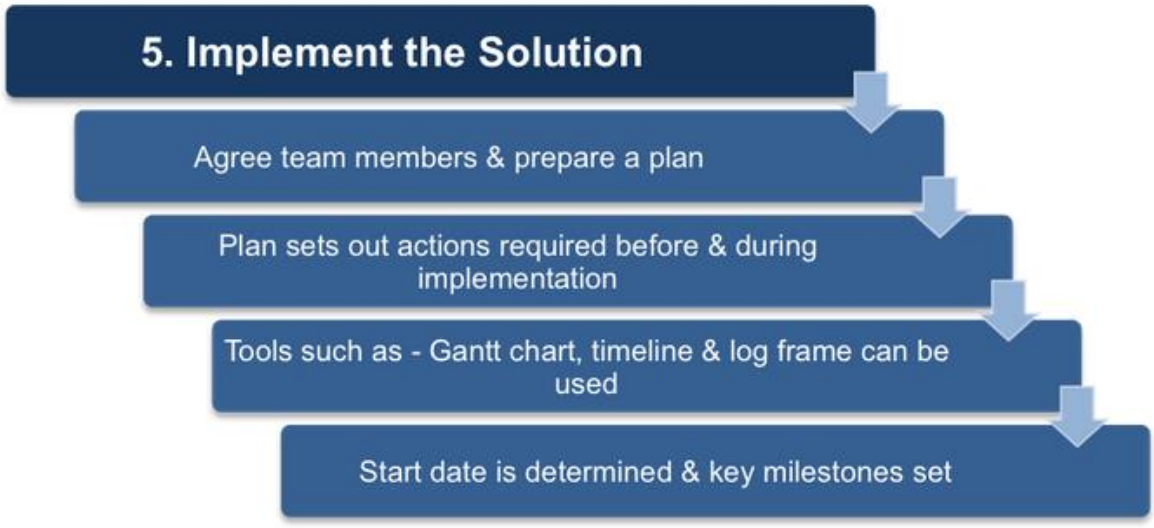
Acceptance by the people who will use and implement the solution is the key to success.

This is where the previous steps come into play. To users and implementers, a solution may seem too radical, complex or unrealistic. The previous two steps help justify the choices made by the PS group, and offer a series of different, viable solutions for users and implementers to discuss and select from.

Step Five: Implement the Solution

Once the solution has been chosen, initial project planning begins and establishes:

- The project manager.
- Who else needs to be involved to implement the solution?
- When the project will start.
- The key milestones
- What actions need to be taken before implementing the solution
- What actions need to be taken during the implementing the solution
- Why are these actions necessary?



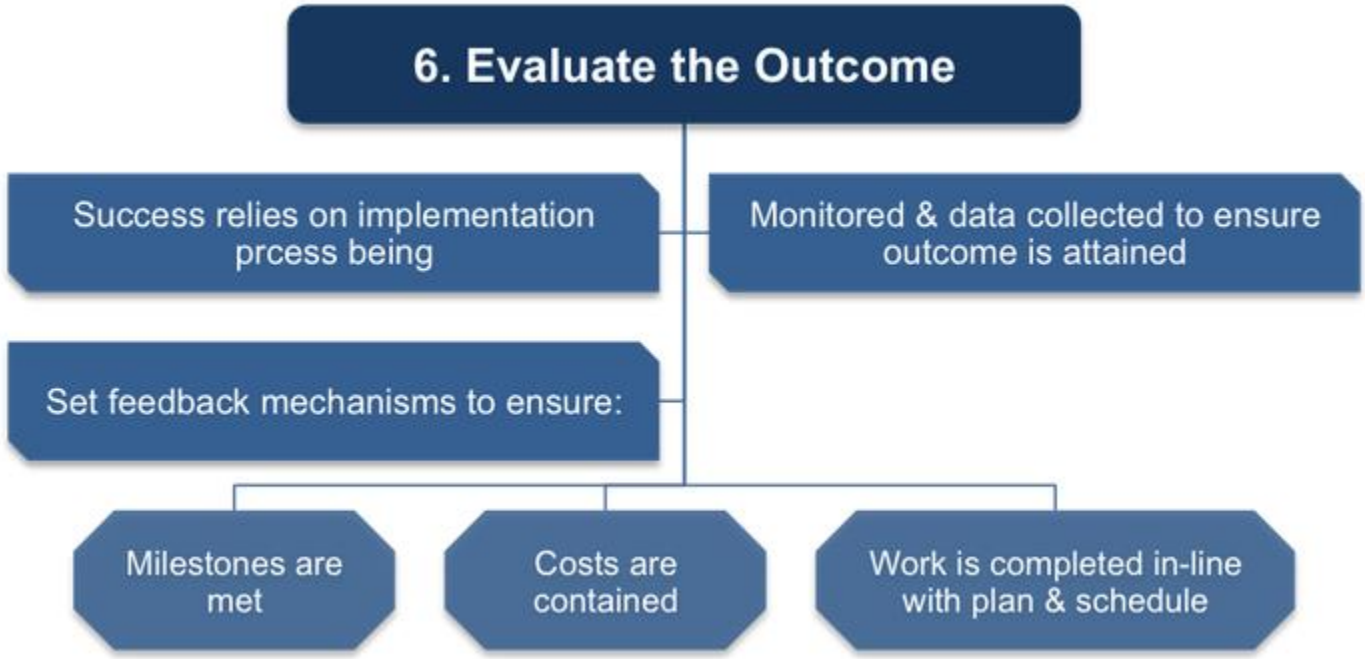
The group may use tools, such as a Gantt chart, timeline or log frame. Between Steps Five and during Step Six the operational/technical implementation of the chosen solution takes place.

Step Six: Evaluate the Outcome

The project implementation now needs to be monitored by the group to ensure their recommendations are followed. Monitoring includes checking:

- Milestones are met
- Costs are contained
- Necessary work is completed

Many working groups skip Step Six as they believe that the project itself will cover the issues above, but this often results in the desired outcome not being achieved.



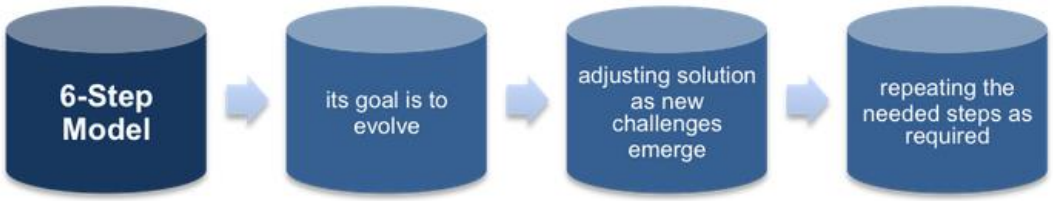
Effective groups designate feedback mechanisms to detect if the project is going off course. They also ensure the project is not introducing new problems. This step relies on:

- The collection of data
- Accurate, defined reporting mechanisms
- Regular updates from the Project Manager
- Challenging progress and actions when necessary

In Step Six, as the results of the project emerge, evaluation helps the group decide if they need to return to a previous step or continue with the implementation. Once the solution goes live, the PS

group should continue to monitor the solutions progress, and be prepared to re-initiate the Six Step process when it is required.

Overall, the Six Step method is a simple and reliable way to solve a problem. Using a creative, analytical approach to problem solving is an intuitive and reliable process.



It helps keep groups on track, and enables a thorough investigation of the problem and solution search. It involves implementers and users, and finds a justifiable, monitorable solution based on data.

2.3 Identifying fundamental causes and conducting investigation

Troubleshooting is the process of figuring out how to solve a computer problem. Even with the most updated software and hardware, occasionally computers can malfunction.

In order to solve a problem, you must figure out which part of the system is malfunctioning. You will need to check each component of the computer, unless it is obvious where the problem is coming from. Isolating the problem will help you solve the problem quickly. Knowing how to solve these problems with a shortcut perhaps using only a few keys on the keyboard can save time and effort.

Backing up your important computer files to another source will ensure that if your problem cannot be corrected, you will still have a safe copy of your information.

Below we describe some of the most commonly encountered technology Problems.

- The printer is not working.
- The computer is frozen. A program is not responding.
- The keyboard is not working.
- New hardware or software is working incorrectly.
- The mouse is not working.
- The computer is slow.
- The browser's homepage suddenly changed.

2.3.1 Common Solutions for common problems

Problem: The printer is not working.

- Check if the printer is turned on. If not, turn it on and try again.
- Check if the printer has paper. If not, put paper in the paper tray and try printing again.
- Check if the printer has a paper jam. If so, remove the paper, close the printer, and try printing again.
- Ensure that all printer cables are properly connected.
- Turn off the printer and turn on again.
- Check to see if a new printer driver is needed. Do this by going to the manufacturer's website to search for your printer model and checking for any updated driver. Seek assistance from your system administrator before installing any drivers.

Problem: The computer is frozen. A program is not responding.

- Use the Task Manager to end the program not responding.
- Perform a hard reboot by simply pressing the on/off button to turn off the computer manually. This action should only be done as a last resort if you have an unresponsive program or critical error. This process could cause data loss or corruption.
- Once the computer is responding again, run a virus check.

Problem: The keyboard is not working.

- Make sure the keyboard is connected to the computer. If not, connect it to the computer.
- If you are using a wireless keyboard, try changing the batteries.
- If one of the keys on your keyboard gets stuck, turn the computer off and clean with a damp cloth.
- Use the mouse to restart the computer.

Problem: New hardware or software is working incorrectly.

- Verify your computer meets the requirements of the program or utility.
- Uninstall and install the program.
- There could be a conflict with another installed program and you should contact your system administrator.

Problem: The mouse is not working correctly.

- Check if the mouse is securely plugged into the computer. If not, plug it in completely.
- Check to see if the cord has been damaged. If so, the mouse may need replacing.
- If you are using a cordless mouse, try pushing the connection button on the underside of the mouse to reestablish a connection.
- Clean the mouse, especially on the bottom.

Problem: The computer is slow.

- **Restart** your computer.
- Verify that there is at least 200-500 MB of free hard drive space. To do so, select Start and click on My Computer or Computer. Then highlight the local C drive by clicking on it once. Select the Properties button at the top left-hand corner of the window; this will display a window showing how much free and used space you have. If you need to recapture space:

- ✓ **Empty your recycle** bin by right-clicking on the Recycle Bin icon (usually on the desktop), then selecting Empty Recycle Bin.
- ✓ Check your **mail files**. Remove any large attachments and delete unused mail. - Images and videos take up a lot of space, so consider moving those to an external drive.
- ✓ **Remove temporary files** from the Internet. To do so:
    - Click Start button | My Computer or Computer.
    - Click Open Control Panel at the top of the window.
    - Click Network | Internet |Internet Options.
    - Select the General tab and click Delete under Browsing History.
- ✓ Perform a **disk cleanup**. To do so:
    - Click Start button | My Computer or Computer.
    - Highlight the local C drive by clicking on it once.
    - Select the properties button at the top left of the window.
    - Go to the General tab and select Disk Cleanup.
    - Once the Disk Cleanup finishes running, click on Clean up System Files; this will delete any unnecessary system-related files from your local disk.
- ✓ Information in computer files changes often, resulting in gaps or spaces within the file. This takes up more space on the computer and can cause the computer to slow down. To reclaim these gaps in space, run **disk defrag**. To do so:
    - Click start | My Computer or Computer.
    - Highlight the local C drive by clicking on it once.
    - Select the properties button at the top left of the window.
    - Go to the Tools tab and select Run Defragmentation.

- Old or unused programs that aren't being used may still have components running behind the scenes when you start your computer, which can slow down the system. You can prevent these programs from running when you start your computer by removing unused shortcuts and turning off unused program services.
    - ✓ Remove unused shortcuts from Windows startup
        - Click Start button | Select All Programs | Click Startup
        - Right-click the shortcuts that you do not use and click delete

- ✓ Disable unused program services
  - Click Start button | Control Panel | Administrative Tools | Services
  - For each program/service that you are certain that you do not need, click on the Service to highlight it, click the Stop link to stop the service from running, then double-click the service, choose Startup Type of Disabled, and click OK.
- Run a virus scan to remove potential viruses that can slow down your computer.

Problem: The browser's homepage suddenly changed.

- This is a common symptom that a virus or browser hijacker may have infected the computer.
- Try re-setting the home page to the default:
  - ✓ In Internet Explorer:
    - On the Tools menu, click Internet Options.
    - Click the General tab.
    - In the Address box, type the Web address you want for your home page.
    - Click OK.
  - ✓ In Mozilla Foxfire:
    - Open the web site you want to set as your home page.
    - Click the icon to the left of the web address and drag it to the Home button.
    - Click Yes.
- If the home page still reverts back to the "new" page, do an Internet search using keywords that include the name of the "new" homepage and the word "virus." If there is a virus, this search may reveal more information on the virus and how it can be safely removed.
- Run a virus scan.

Self-Check 1

Name: _____ Date: _____

Instruction*:* Answer all the questions listed below, if you have some difficulty doing this self-check, feel free to ask your teacher for clarifications.

True/False: Write True or False.

_____ 1. The most frequently used method of identifying causes of computer problems are gathering additional information.

_____ 2. 'Getting input from other people who notice the problem and who are affected by it' is one the way to causes of computer problems.

_____ 3. Using diagnostic tools causes of computer problems can be identified.

_____ 4. 'White spots and lines appear on the screen' is a damage caused by Temperature Variation.

_____ 5. Power Line Noise is a problem caused by poor quality power being supplied to a computer system, which creates some spikes and transients.

Self-Check 2

Name: _____ Date: _____

Instruction*:* Answer all the questions listed below, if you have some difficulty doing this self-check; feel free to ask your teacher for clarifications.

True/False: Write True or False.

_____1. The six steps problem solving model eliminates the confusion caused when people use different problem-solving techniques on the same issue.

_____2. Brainstorming, Interviewing, and Questionnaires are techniques used to collect the information in a structured way, and focus in on the underlying causes of the problem.

_____3. Problem solving group will not focus 'Looking at how each solution relates to the root cause and symptoms of the problem'.

_____4. Acceptance by the people who will use and implement the solution is the key to success.

_____5. In Step Six, evaluation helps the group to decide if they need to return to a previous step or continue with the implementation.

Self-Check 3

Name: _____ Date: _____

Instruction*:* Answer all the questions listed below, if you have some difficulty doing this self-check; feel free to ask your teacher for clarifications.

Choice: Choose the correct answer.

1. _____ is the process of figuring out how to solve a computer problem.
   A. Troubleshooting B. Problem C. Maintenance D. None
2. The first thing to do in the case of Printer Problem is to check if the printer is turned on.
   A. True B. False
3. Which of the followings the correct action if keyboard is not working?
   A. Make sure the keyboard is connected to the computer. If not, connect it to the computer.
   B. If you are using a wireless keyboard, try changing the batteries.
   C. If one of the keys on your keyboard gets stuck, turn the computer off and clean with a damp cloth.
   D. All
4. What will you do if Information in computer files changes often, resulting in gaps or spaces within the file?
   A. Remove Temporary Files B. Run Disk Defrag C. Disc Cleanup D. None
5. Which of the followings can be considered as a common solution for a slow computer?
   A. Restarting the computer
   B. Verify that there is enough free hard drive space.
   C. Uninstalling unused programs
   D. All

Operation Sheet-2

Operation title: -Perform Activity

Purpose: -Optimize computer performance

Required tools and equipment: -Computer

Instruction: -Activity 1: Task Manager

- The first Option: Push the **Ctrl, Alt, and Delete keys** at the same time. Then, start the Task Manager, highlight the program's name, and hit the **End** Task button.
- Second Option: Right Click the **Taskbar** from your desktop → Click **Task Manager** Then, highlight the program's name, and hit the **End** Task button.

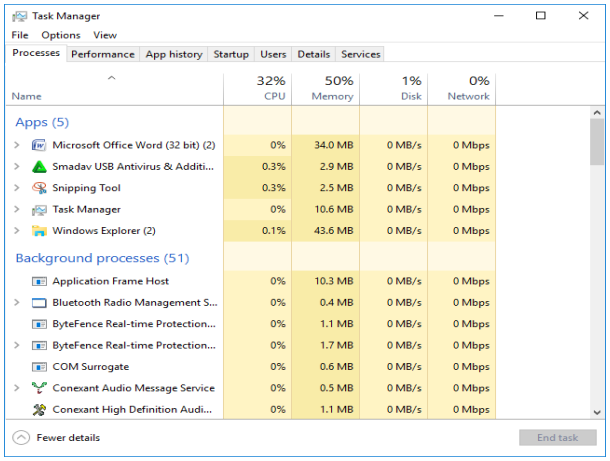


Fig. 1.1 Task Manager Window.

Activity 2: Remove Temporary Files

- ➔ Click Start button
- ➔ Click Control Panel
- ➔ Click Network | Internet |Internet Options.
- ➔ Select the General tab and click Delete under Browsing History.

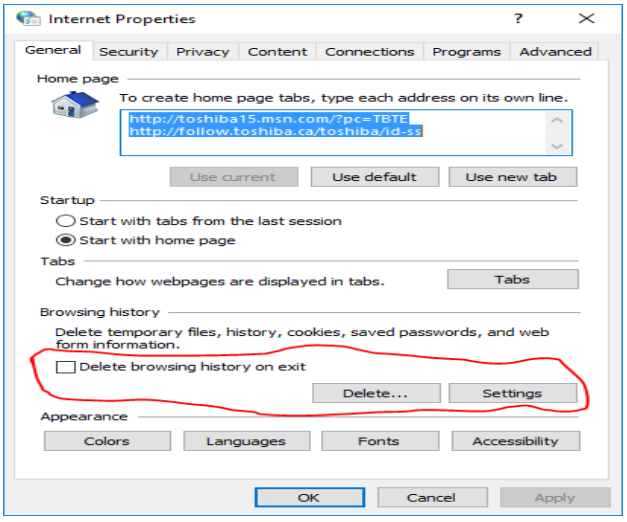


Fig. 1.2 Internet Option

Activity 3: Disk cleanup.

- ➔ Click **Start button | My Computer** or **Computer.**
- ➔ Highlight the local **C** drive by clicking on it once.
- ➔ Select the **properties** button at the top left of the window.
- ➔ Go to the **General tab** and select **Disk Cleanup**.
- ➔ Once the Disk Cleanup finishes running, click on Clean up System Files; this will delete any unnecessary system-related files from your local disk.

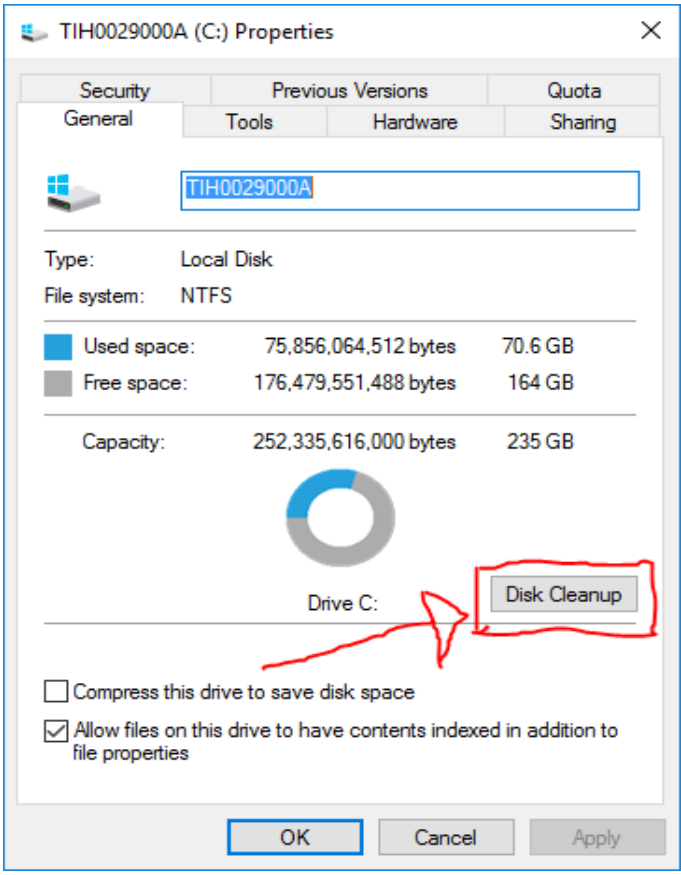


Fig. 1.3 Disk Cleanup

Activity 4: Disc Defragmentation/Optimization

- ➔ Click **start | My Computer or Computer**.
- ➔ Highlight the local **C** drive by clicking on it once.
- ➔ Click the **properties** button at the top left of the window.
- ➔ Go to the Tools tab and click **Optimize** button.
- ➔ Then the disk and click **Optimize** button.

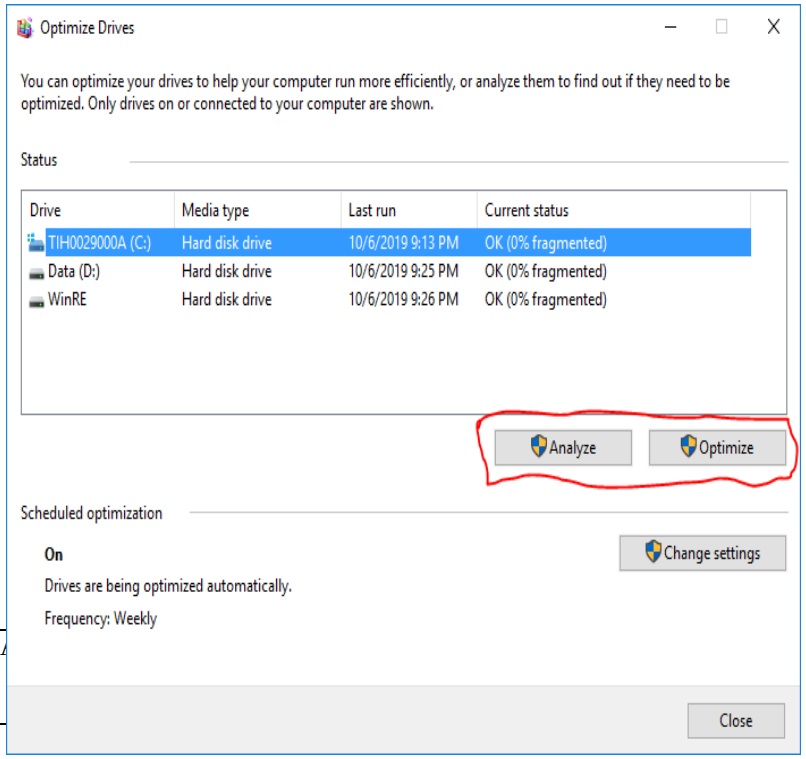


Fig. 1.4 Optimize Drive

Lap Test	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: You are required to perform the following individually with the presence of your teacher.

Please ask your trainer for the instructions for this lap test.

Activity 1: Follow the steps showed in "operation sheet 1, **Activity 1 Task Manager**" to forcefully close programs that are currently running.

Activity 2: Follow the steps showed in "operation sheet 1, **Activity 2 Remove Temporary Files**" to remove temporary Data using Internet Options.

Activity 3: Follow the steps showed in "operation sheet 1, **Activity 3 Disk Cleanup**" to delete any unnecessary system-related files from your local disk.

Activity 4: Follow the steps showed in "operation sheet 1, **Activity 4 Disc Defragmentation/ Optimization**" to optimize the hard disk.

Answer Key-Unit Two

Self-Check 1	1. True 2. True 3. True 4. False 5. True

Self-Check 2	1. True 2. True 3. False 4. True 5. True

Self-Check 3	1. A 2. A 3. D 4. B 5. D

Unit Three: Recommend solutions to problem

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identifying potential solution to problem
- Recommendation about possible solutions
- Planning Implementation and evaluation of solutions
- Documenting and submitting recommended solutions

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this module, you will be able to:

- Identifying potential solutions to problems
- developing, documenting, ranking and presenting recommendations about possible solutions to the appropriate person for decision
- Planning implementation and evaluation of solutions
- Documenting and submitting recommended solutions to the appropriate person for confirmation

3.Identifying potential solution to problem

3.1 Introduction

As IT professionals, we are regularly expected to troubleshoot all kinds of technology problems as they arise during the day to day operations of our jobs.

Sometimes the issues we face are minor in nature and very easily solved – a help desk ticket for example, where a new employee can't access or save files on their home drive (in this case, because the person who created the user account, forgot to create the home drive as well!).

When your computer is not running properly the first course of action is to do a proper shut down, and restart. Click on the Start button, select "shut down". Leave the PC off for 1 to 2 minutes. Turn the PC back on again. If the PC is frozen and you cannot shut it down, hold the power button on the CPU for 30-40 seconds until it shuts down.

Common Problems:

3.1.1. An Unresponsive PC

- First check the cable. Unplug it from the computer and the outlet. Re-plug in both sides and try booting it again.
- Check the wall outlet. Plug something else into the outlet and see if it works. If you have a surge protector try a different outlet.
- Turn the system off and wait 30 seconds and then try again.
- Reach behind the machine and see if you feel air blowing out of the power supply. If you do, then you know the machine is getting some power.
- Look at the keyboard for the indicator lights being lit up as the machine boots.
- Sometimes the monitor has something to do with the system acting up. Unplug the power cord from the monitor and the wall and re-plug it. Unplug the cable from the computer to the monitor and re-plug it into the monitor. Try rebooting.
- Listen to identify a beeping series if there is one to report it to the technical help.
- If you have a tower computer you should see indicator lights just above the power button on the PC, if you see any numbers lit up report this to the Help Desk.
- Turn in all comments to the Help Desk.

3.1.2. Monitor Troubleshooting

Symptom 1: The monitor screen is black

Diagnosis

Check to see if the computer turned on.

- Is the computer turned on? There is a light on the CPU. If the computer is on, it will be lit.

Check to see if the monitor getting power.

- If no lights appear on the front of the monitor at all, it is not getting any power from the power source. Check to see if ALL plugs are secure.
- Power cord from the computer to the power strip.
- Power strip to the wall socket.

Check to see if the Power Strip turned on.

- There is a light on the strip. If the strip is on, the indictor light will be on.

Check to see if the monitor getting a signal from the computer.

- There is a light on the monitor. If the monitor is on, it will be lit. If it is turned on, check the contrast and brightness buttons to see if they have been tampered with.
- A green light on the front of the monitor would indicate that it is getting a signal from the computer.
- An orange light would indicate there is not signal from the computer. Make sure the computer is on and you see lights on the front of it. Check the cable that runs from the monitor to the computer to see if it has worked loose.

Check to see if the brightness has been turned entirely down.

- Make sure you check the brightness and contrast buttons or settings on the monitor.

Check to see if the computer in Power Save or Sleep mode.

- Move the mouse or press any key on the keyboard to see if the computer will "wake-up."

Check to see if all peripherals plugged in.

- Verify that all cables and cords leading in to and out of your computer to insure they are all in tight and not disconnected.

3.1.3. The screen is too bright or too dark

Diagnosis

- Check if the Brightness or contrast control is at the appropriate position, not at the maximum or minimum.

- Check if the specified voltage is applied
- Check if the signal timing of the computer system is within the specification of the monitor.
- Especially, check the horizontal frequency.

3.1.4. The screen is shaking

Diagnosis

- Move all objects that emit a magnetic field, such as a motor or transformer, away from the monitor.
- Check if the specified voltage is applied.
- Check if the signal timing of the computer system is within the specification of the monitor.

3.1.5. Printer Troubleshooting

Symptom 1: The Printer is not printing

Diagnosis

- Check to see if the printer getting power
- If there are no lights or no display on the front of the printer, the printer is not getting electricity or power. Check to make sure the power cord is plugged in both to the wall or power strip and to the back of the printer. Wiggle the power cord where it plugs into the back of the printer to make sure it is not loose. Some models of desk jets have a two-part power cord. In this case, check along the length of the power cord to make sure both parts are plugged in together.
- If the printer is still not getting power, plug the power cord into a different outlet on the power strip. If this does not work, try plugging the printer into a different wall outlet.

Check to see if you can print a Windows test page

The windows test page is a basic communication test between your computer and the printer. To print a Windows test page:

- Left mouse-click on the Start button.
- Go to Settings and then select Printers. Inside the printer window, you should see a small printer icon with the name of printer you are trying to print to.

- Place your mouse arrow on the small printer icon and right mouse-click. A small gray window should appear and the last choice in the box is Properties.
- Left mouse-click on Properties. A printer window with several tabs should appear.
- On the General tab, there is a Print Test Page button in the lower right corner. Left mouse-click on the button. You may click on the "Yes" button on your screen, but the real question is: Did anything print from the printer?
- If the answer is no, please call or e-mail the Help Desk at x1112.
- If you can print a Windows test page, try to print from a different program. If the document does not print from that program, the printing problem has to do with that program.

Check to see if there is paper in printer. Is there a paper jam?

- If the printer has paper in the paper tray, the paper may be jammed or not feeding properly. Take the paper out of the paper tray and check to see that the top piece of paper is not crinkled or bent.
- If the printer is a DeskJet, lift-open the front cover and look to see if a piece of paper is halfway fed through. If it is, remove paper gently from the top and close.
- If the printer is a LaserJet, open the top of the printer and check for paper underneath the toner cartridge. If there is paper there, gently remove it, and replace the toner cartridge.

Check to see if the computer getting a signal from the printer.

- The computer and the printer must be communicating before the printer will print. When you send a document to print, does a small printer appear on the Windows taskbar (down by the time)? If this printer appears on the taskbar, the computer thinks the printer is receiving communication. At this point, the printer should blink lights (if a DeskJet) or says "printing" or "receiving" on the display (if a laser printer). If the printer is not receiving the communication from the computer, try restarting the computer. After you have logged in, see if you can print now.

Check to see if Printer offline or Paused.

- If the printer is off-line or paused, the print jobs will just stack up in the print queue but nothing prints.
- Left mouse-click on the Start button
- Go to Settings
- Then choose Printers

- The Printer folder should open and display the printers installed on this PC.
- Place your mouse arrow on the printer you are checking and right mouse click. A dialog box should open.
- If the printer is paused or offline you will see a black check mark next to the words "Pause Printing" or "Printer Offline."
- Left mouse-click on the black check mark and see if you can "uncheck" it.
- If the check mark will not go away, try restarting the PC (Start – Shutdown – Restart).
- Then repeat steps 1 through 7 again.
- If the printer is still not printing, please contact the Help Desk at x1112

Check to see if their multiple jobs in the Print queue.

- If the printer is a local printer (i.e., there is a cable running directly from the printer to the computer you are printing from), power off the PC, power off the printer, count to 10, and then turn both the printer and the computer back on again. Sometimes this will allow the printer to start printing again.

3.1.6. The printer is printing streaks on the page

Diagnosis

- If the printer is a DeskJet, go to the HP DeskJet Utilities menu in the Program menu. Choose the "Clean the Print Cartridges" option. If this does not work, try replacing the ink cartridge. If the new cartridge does not help the streaking, place the cartridge back inside the original packaging and save it until the other cartridge has been used up. This just tests to see if the ink cartridge is defective.
- If the printer is a LaserJet, try changing the toner cartridge. If the new toner cartridge does not improve the streaking problem, return old cartridge to the printer and place the new toner cartridge back in its original packaging for later use.
- If neither option works, please visit the printer maintenance vendor list to schedule printer service.

The printer in spite of everything is not printing?

- Turn the PC off. If the printer is a local printer, i.e., has a direct cable hookup to the PC, turn the printer off also so both the PC and printer are turned off at the same time. After 30

seconds, turn the PC and the printer back on again. Try to print a Windows test page. If the printer still does not print, please contact the Help Desk x1112.

3.1.7. CD Troubleshooting

Symptom: The computer won't read the CD

Diagnosis

Check to see if the label side of the CD is faced up

Check to see if the CD be read from the CD Rom drive of another computer

- If the CD can be read from another computer's CD ROM drive, the CD ROM drive may be bad and need to be replaced.
- The CD ROM drive may also have dirt or debris inside. Try cleaning the drive with a standard audio CD player cleaning kit. After cleaning the drive, try to read the CD again.

Check to see if the CD scratched or dirty

- CD, CDR, or CDRW drives read discs by shining a laser onto the CD and then measuring the amount of light that gets reflected back. Most of the time a small scratch won't matter.
- If the CD is dirty, you can clean the CD using a CD Cleaning kit or you can also use a mild detergent, like dish soap, and warm water, wash the CD and dry with a soft cloth. Once the CD is fully dry, insert the CD into the CD ROM drive and try to read it.
- If the CD is not dirty, you can try to clean the CD Rom drive using a professional CD cleaner kit

Check to see if the CD is a CD-R or CD-RW that was burned

- A number of older CD drives cannot read some types of CD-R CDs. Try using a different CD-R disk with a different dye under the reflective layer. You will have noticed that some CD-R disks are blue, gold, green, or even silver colored. Some of the colors have a lower light reflectivity value and an older CD Rom drive may have difficulty reading that brand of CD-R media.

3.1.8. Keyboard Troubleshooting

Symptom: Keyboard doesn't respond and gives off a constant beeping noise when booting up

Diagnosis

Check the plug to make sure it's connected securely.

- Try unplugging it and re-plugging it again. If there is no response, check the indicator light on the keyboard. Is it on? Do the lights respond when you press the caps lock or the num lock key? If not, maybe your keyboard is broken.

Check to see if there a key stuck

- Gently pry off the cover and clean it with alcohol. Make sure it is not connected to your machine when you are cleaning it. The space bar frequently comes off track. Gently pry it off, noting which way the bar lies in your particular keyboard so you can replace it properly.

3.1.9. Mouse Troubleshooting

Symptom 1: The mouse is acting erratic

Diagnosis

Reboot the computer and see if that corrects the problem. If not check to see if there is insufficient memory.

Symptom 2: The mouse will only move one way, either vertically or horizontally

Diagnosis

- Clean the mouse
- Shut down your machine and unplug your mouse from the computer. Open the underside of the mouse and remove the ball. If the ball is a rubber ball, do not clean it with alcohol. Clean it with a soft cloth. There should be no lubricant placed on a mouse ball. Clean the roller in the body of the mouse with a cotton swab that is slightly damp with alcohol. Replace the ball when the rollers are dry and replace the bottom portion.

3.1.10. Networking Troubleshooting

Symptom: My PC is not working on the Network

Diagnosis

Programs that **require** network drives to run or operate properly: SIS, HR, FRS, PROD – ALPHA, Network Shares, and some school applications. You would also need a network connection to print to the network laser or colour laser printers within CCRI.

3.1.11. Video/Screen Troubleshooting

Symptom 1: The Monitor is Black

Diagnosis

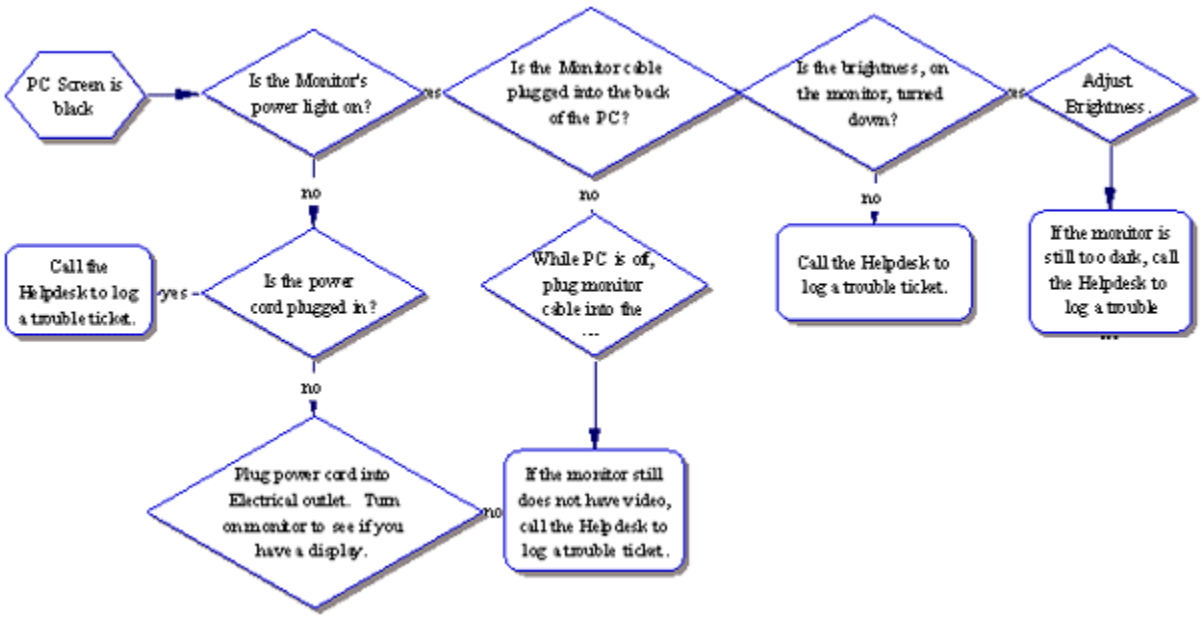


Fig. 1.1 Monitor Troubleshooting Diagram

Symptom 2: The desktop Icons are too IMMENSE or too undersized

Diagnosis

Usually this is due to the Display Settings. The standard video setting for most College software is 800x600. To check the video display settings:

- Left mouse-click on the Start button (lower left-hand corner of the screen).
- Go to Settings. Go to Control Panel.
- Once in the Control Panel, look for the Display icon.
- Double left mouse-click on the Display icon.
- In the Display Properties box, left mouse-click on the settings tab.
- Place your mouse arrow on the slider, hold down the left-mouse button, and move the arrow until the number changes to the desired setting.
- 640x480 screen resolution has fewer pixels so the screen appears larger. 1024x768 screen resolution has more pixels in the same screen area so the appears smaller.

Symptom 3: The Screen goes black if not used for a few minutes

Diagnosis

- The power saver or energy saver features may be turned on. To correct this problem, you can turn off the feature.
- Left mouse-click on the Start button (lower left-hand corner of the screen).
- Go to Settings. Go to Control Panel.
- Once in the Control Panel, look for the Display icon.
- Double left mouse-click on the Display icon.
- Left mouse-click on the Screen Saver tab.
- Left mouse-click on the Power or Settings button (depends on your version of Windows) in the lower left corner.
- On the Power schemes tab, you should see where it says "Turn off monitor:" with an amount of time next to it. Left mouse-click on the drop-down arrow.
- Change the time to "Never."
- Left mouse-click on the Apply button in the lower right-hand corner.
- Left mouse-click on the OK button.
- Left mouse-click on the next OK button.

3.1.12. Sound Troubleshooting

Symptom 1: The computer has no sound

Diagnosis

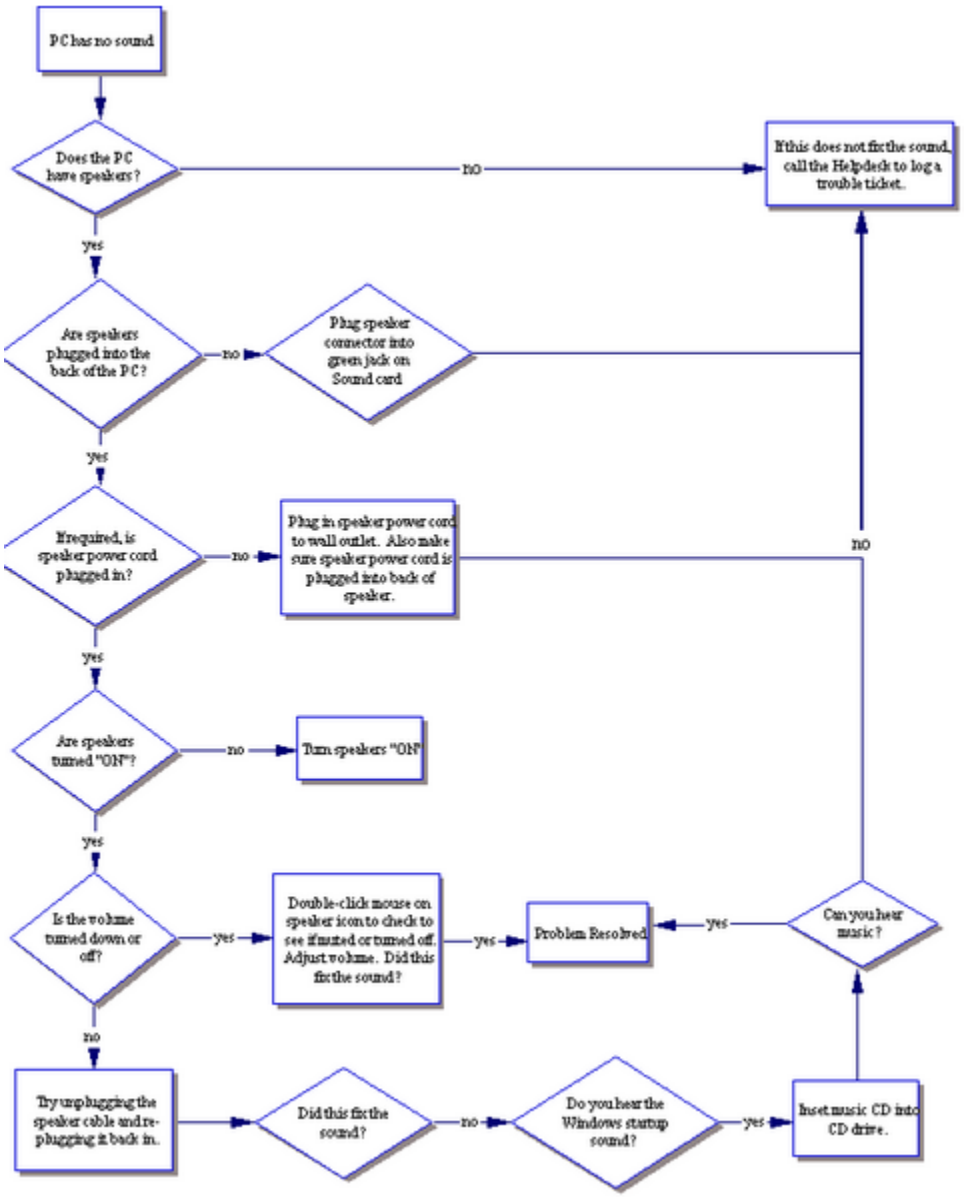


Fig. 1.2 Sound Troubleshooting Diagram

Symptom 2: No sound is heard from audio (music) CDs

Diagnosis

- Look for the Volume icon in the system tray in the lower right-hand corner of the Windows desktop.
- Place the mouse arrow on this icon.

- Double left-mouse click. The Volume Control dialog box should appear on the computer screen.
- Place the mouse arrow on the "slider" button and slide the arrow up to increase or down to decrease the volume.
- If "Mute all" check box is checked, there will be no sound. To enable the sound again, uncheck the box.
- Ensure the speakers are properly connected to the audio card's output connector and turned on.

Symptom 3: There is no volume icon in the lower right corner

Diagnosis

- To place the volume icon in the system tray in the lower right of the desktop:
- Place the mouse arrow on the Start button in the lower left corner.
- Left mouse-click on Settings.
- Left mouse-click on the Control Panel
- Place the mouse arrow on the Multimedia icon
- Place the mouse arrow on the Multimedia icon.
- Double-left mouse click.
- Left mouse-click on the Audio file tab.
- Towards the bottom look for the check box that reads "Show volume control on taskbar."
- Make sure the box is checked to activate the icon

3.1.13. Startup Troubleshooting

If your computer is making noise or attempting to start up, but there is no video or no display on the monitor.

Symptom 1: No power lights on the monitor/computer

Diagnosis

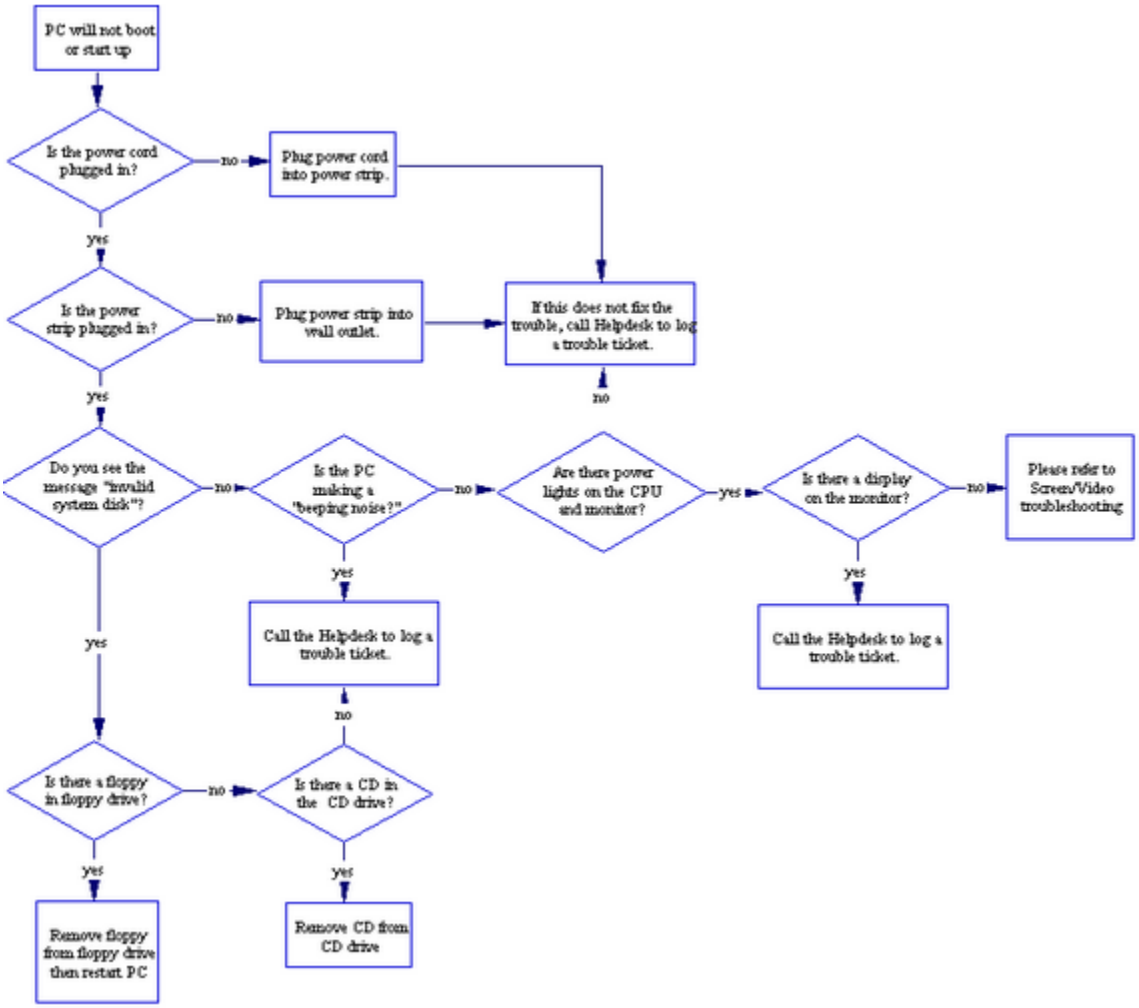


Fig. 1.3 Startup Troubleshooting Diagram

3.1.14. Hard Drive Troubleshooting

Symptom 1: The cursor is stuck on the hourglass

Diagnosis

Open Task Manager

- Simultaneously press [Ctrl] [Alt] [Delete]. You will see a list of all tasks (programs) currently running. You may notice one program has "Not Responding" instead of "Running" listed next to it. Select this task and click the End Task button.
- Another dialog box will open stating that the program is not responding. Choose End Now to close the program.

Reboot your computer (Warm Boot)

Resetting a computer that is already turned on:

- Press [Ctrl] [Alt] [Delete] once to open the Task Manager.
- Press [Ctrl] [Alt] [Delete] again to restart the computer.

Shut down your computer (Cold Boot)

- Start-up of a computer from a powered-down state. If you restart your computer and the problem isn't resolved, make an attempt to completely shut down the computer by pressing the power button. Let it set for 15-30 seconds then restart the computer.

Symptom 2: You have run out of disk space on your computer. Music files, movies, digital pictures, and other big data files can fill up your hard drive.

Diagnosis

To check for disk space:

- Open My Computer. Right click on the C: drive and select Properties from the shortcut menu. A pie chart will appear telling you the used and free space.
- Try running the Disk Cleanup Wizard. This utility can tell you whether you are running out of room and help you clear away some space. Click the Start button and choose Programs | Accessories | System Tools | Disk Cleanup. Choose the disk to clean up (C:) and let the wizard do the work.

3.2 Recommendation about possible solutions

3.2.1 Developing/Ranking alternatives

Look at your problems in different ways; find a new perspective that you haven't thought of before.

Brainstorming, or rapid noting of alternatives no matter how silly, is an excellent discovery process.

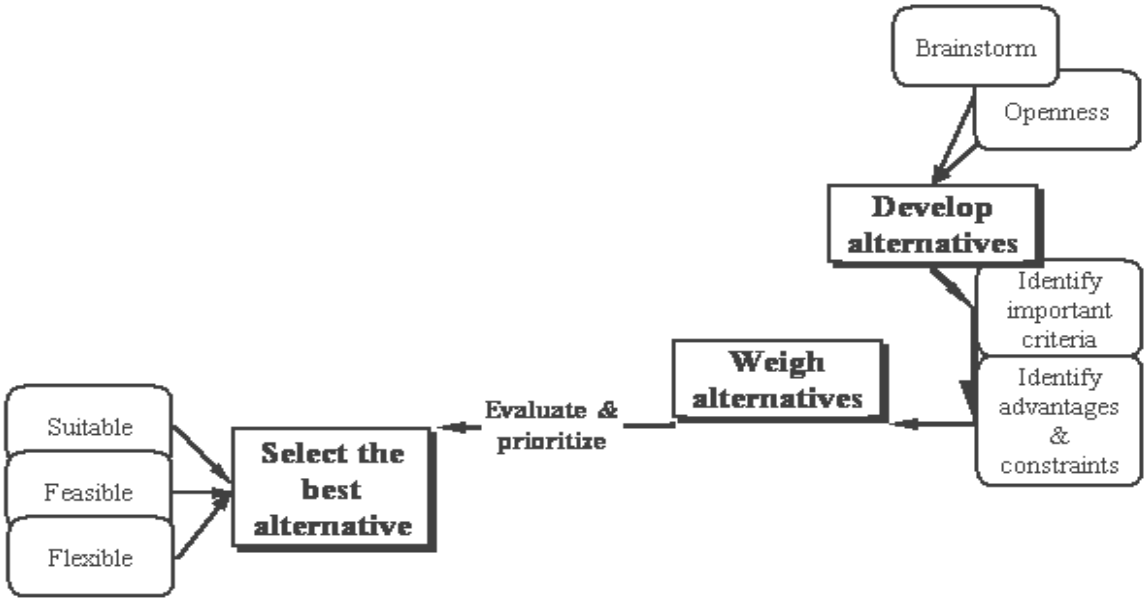
Once you have listed or mapped alternatives, be open to their possibilities.

Weigh/Rank Alternatives

After listing possible alternatives, evaluate them without prejudice, no matter how appealing or distasteful.

Consider all criteria

While a suitable solution may solve the problem, it may not work if resources aren't available, if people won't accept it, or if it causes new problems.



Select the best alternative

- **Don't consider any alternative as "perfect solution."**
  If there were, there probably wouldn't be a problem in the first place
- **Consider your intuition,**
  or inner feelings in deciding on a course of action

- **Return to your trusted outsider:**

  Is there something you missed?

  Does he/she see a problem with your solution?

- **Compromise**

  Consider compromise when you have a full grasp of the problem, and your alternatives.

  Competing solutions may yield a hybrid solution.

Techniques in weighing alternatives:

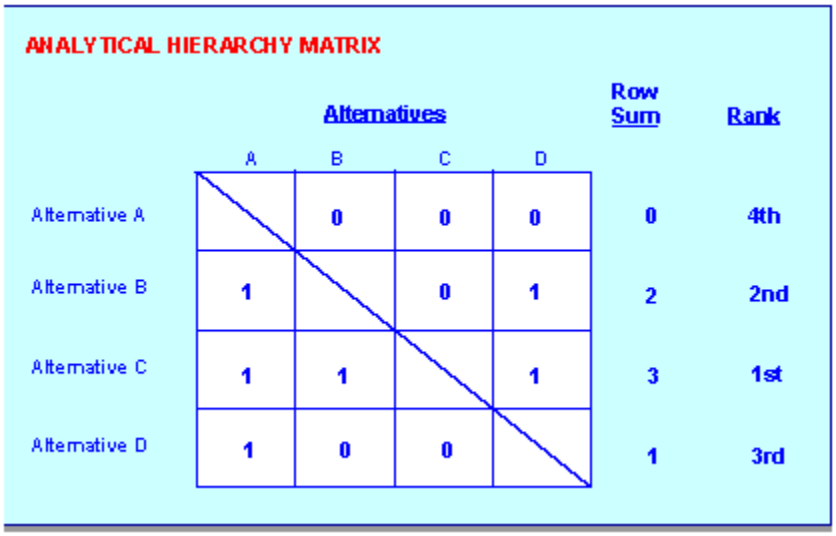


Figure 1: Alternatives weighing diagram

List alternatives in columns and rows as depicted in the matrix above. Starting with Alternative **A**, go across columns in the matrix and rate each alternative against all the others.

- **When** the alternative under consideration has more value than the others, **then** give the more valuable alternative a score of **1**.
- **When** the alternative has less value than the others give the less valuable alternative a score of **0**

Add the scores for each row/alternative; highest score is the highest rated alternative according to the criteria you used. In the matrix above, Alternative C scores highest, so it's the highest rated alternative.

SFF Matrix: Suitability, Feasibility & Flexibility

	Suitability	Feasibility	Flexibility	Total
Alternative A				
Alternative B				
Alternative C				
Alternative D				

Rate each alternative on scale of 1 - 3 for its

- **Suitability:** refers to the alternative itself, whether it is ethical or practical.
  - ✓ Is it appropriate in scale or importance?
  - ✓ Is it an adequate response?
  - ✓ Is it too extreme?
- **Feasibility:** refers to how many resources will be needed to solve the problem.
  - ✓ Is it affordable?
  - ✓ How likely will it solve the problem?
- **Flexibility:** refers to your ability to respond to unintended consequences, or openness to new possibilities, the alternative itself, and whether you can control outcomes once you begin.

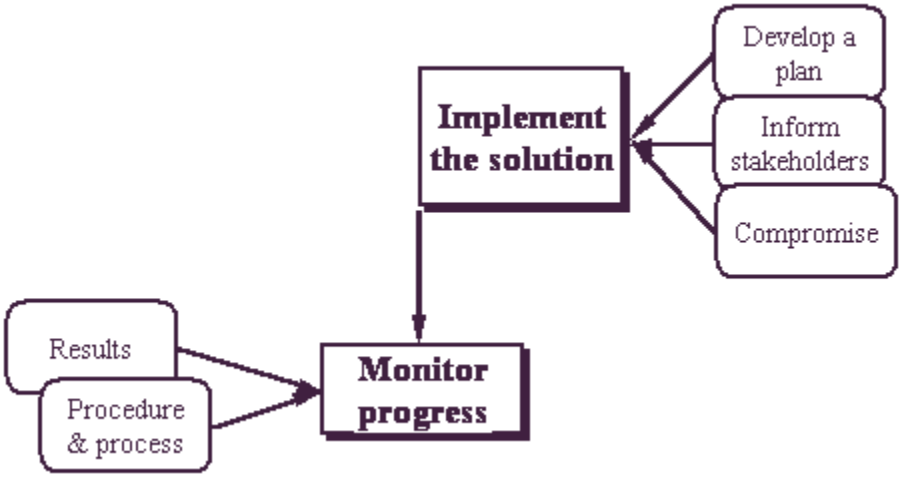
Then, total a score for each alternative, compare, prioritize your alternatives.

3.3 Planning Implementation and evaluation of solutions

3.3.1. Develop a plan for implementation

Elements:

- Step-by-step process or actions for solving the problem.
- Communications strategy for notifying stakeholders. Where important or necessary, inform those who care for you and/or will be affected by the change. Prepare them as necessary about your decision
- Resource identification/allocation
- Timeline for implementation



3.3.2 Monitoring/Evaluating progress

Your implementation will only be successful if you are evaluating your solution, the effects of it on resources and stakeholders, your timeline, and your progress. As you monitor your progress, if results are not what you expect, review your options and alternatives.

Whether or not you achieved your goals, it is important to consider what you have learned from your experience: about yourself, about what you consider important.

Lastly, if you have done your best, you have this as one measure of success.

3.4 Documenting and submitting recommended solutions

3.4.1 Documenting system problems and symptoms

Your success as a fault-finding technician greatly depends on your ability to accurately document a fault and its symptoms. You might be surprised to know that a great part of the answer lies within the documentation of the problems and its symptoms. Hence, it is vital that documentation is not overlooked and appropriate standards are observed.

Documentation standards

Many businesses choose to set-up their own standards for documenting IT systems, help-desk procedures, and change management. Businesses tend to be very diverse in size, complexity and IT infrastructure; hence, their documentation requirements may vary. One thing is important though, good quality documentation is good practice and a must-have.

Worldwide, the ITIL (Information Technology Infrastructure Library) has emerged as a de-facto standard for many areas of IT. ITIL is a set of best practices standards for Information Technology service management. They too provide standards (and actual templates) for maintaining documentation. ITIL is controlled by the Office of Government Commerce (OGC) in the United Kingdom. For more information about ITIL you may want to visit them at www.itil.org.uk

3.4.2 Document the process.

Once everything is fully functional, documenting the process becomes important. This is where you document findings, actions, and outcomes. When the problem occurs again, there will be information available to walk someone through the means of troubleshooting and resolving the issue.

This documentation also captures a history of equipment and users so that perpetual issues become known and recorded. An important aspect of this is that both positive and negative outcomes should be documented. This can save time during future troubleshooting and prevent others from taking the same missteps you may have taken.

Highlights:

- Capture your findings, actions, and outcomes.
- Issues that need to be troubleshot may occur again.

- Documentation provides a history of equipment and users so that problem issues are known.

Self-Check 1

Name: _____ Date: _____

Instruction*:* Answer all the questions listed below, if you have some difficulty doing this self-check, feel free to ask your teacher for clarifications.

Short Answer: Give a short answer for the following Questions.

1. Write the diagnosis steps for the following symptoms in troubleshooting hard drives

   Symptom 1: The cursor is stuck on the hourglass.

   Symptom 2: You have run out of disk space on your computer. Music files, movies, digital pictures, and other big data files can fill up your hard drive.

Self-Check 2

Name: _____ Date: _____

Instruction*:* Answer all the questions listed below, if you have some difficulty doing this self-check, feel free to ask your teacher for clarifications.

True/False: Write True or False.

_____1. While a suitable solution may solve the problem, it may not work if resources aren't available, if people won't accept it, or if it causes new problems.

_____2. In selecting the best alternatives, the first consideration is **“**Don't consider any alternative as perfect solution."

_____3. Feasibility refers to your ability to respond to unintended consequences, or openness to new possibilities, the alternative itself, and whether you can control outcomes once you begin.

_____4. In alternatives ranking technique, when the alternative under consideration has more value than the others, then give the more valuable alternative a score of 1.

_____5. In alternatives ranking technique, when the alternative has less value than the others, give the less valuable alternative a score of 0.

Self-Check 3

Name: _____ Date: _____

Instruction*:* Answer all the questions listed below, if you have some difficulty doing this self-check, feel free to ask your teacher for clarifications.

Short answer: Give a short answer for the following questions.

1. Write the elements in developing a plan for implementation.
   - _____
   - _____
   - _____
   - _____

Self-Check 4

Name: _____ Date: _____

Instruction*:* Answer all the questions listed below, if you have some difficulty doing this self-check, feel free to ask your teacher for clarifications.

True/False: Write True or False.

_____1. Your success as a fault-finding technician greatly depends on your ability to accurately document a fault and its symptoms.

_____2. It is a good practice to have good quality documentation.

_____3. ITIL is a set of best practices standards for Information Technology service management.

_____4. Documentation provides a history of equipment and users so that problem issues are known.

Operation Sheet-3

Operation Title: - Troubleshooting Hard Disk
Purpose: - To practice and demonstrate the knowledge and skill required in Hard disk troubleshooting
Required tools and equipment: -Computer
Instruction
Step1: Define the Problem

- Look at the symptom of the computer

The Computer Shows" **No Operating System Found**" error message on black screen

Strep2: Look at the potential Causes of the Problem

- The CMOS set up might not be correct
- The hard disk jumper is not on the right place
- The hard disk data cable/IDE cable is unplugged
- The hard disk Power cable is unplugged
- The operating system is corrupted
- The hard disk is physically damaged

Step3: Select an approach to resolve the problem

Before opening the case of the system unit check:

- The CMOS set up program, Enable the hard disk and make the first boot order to be Hard disk

Restart the Pc and look at the symptoms again

Have you solved the problem? If not proceed to the next steps

Step4: Open the System Unit Case

Note: Wear the antistatic wrist strap/ Discharge yourself before touching any components of the pc

Step5: Check the hard disk jumper

Step6: Check the hard disk IDE cable

Step7: Check the hard disk data cable

Have you solved the problem?

Yes: Congratulations!!

No: Format the hard disk/Replace the hard disk

Step8: Take documentation of the problem and the solution

Lap Test	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: You are required to perform the following individually with the presence of your teacher.

Please ask your trainer for the instructions for this lap test.

1. You are required to Perform the following Operation:

You will be given a computer which is not working at the moment. Request your trainer all the necessary tools and equipment's including the safety tools that you need for your operation.

A. Identify the exact problem of the PC
B. Suggest a proper solution and troubleshoot the PC
C. Prepare a report of the problem and solution

2. Request your trainer for evaluation and feed back

Answer Sheet-Unit Three

Self-Check 1

Symptom 1: The cursor is stuck on the hourglass

Diagnosis

Open Task Manager

- Simultaneously press [Ctrl] [Alt] [Delete]. You will see a list of all tasks (programs) currently running. You may notice one program has "Not Responding" instead of "Running" listed next to it. Select this task and click the End Task button.
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Reboot your computer (Warm Boot)

Resetting a computer that is already turned on:

- Press [Ctrl] [Alt] [Delete] once to open the Task Manager.
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Symptom 2: You have run out of disk space on your computer. Music files, movies, digital pictures, and other big data files can fill up your hard drive.

Diagnosis

To check for disk space:

- Open My Computer. Right click on the C: drive and select Properties from the shortcut menu. A pie chart will appear telling you the used and free space.
- Try running the Disk Cleanup Wizard. This utility can tell you whether you are running out of room and help you clear away some space. Click the Start button and choose Programs | Accessories | System Tools | Disk Cleanup. Choose the disk to clean up (C:) and let the wizard do the work.

Self-Check 2

1. True
2. True
3. False
4. True
5. True

Self-Check 3

- Step-by-step process or actions for solving the problem.
- Communications strategy for notifying stakeholders. Where important or necessary, inform those who care for you and/or will be affected by the change. Prepare them as necessary about your decision
- Resource identification/allocation
- Timeline for implementation

Self-Check 4

1. True
2. True
3. True
4. True

Unit Four: Participate in Workplace Communication

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- Communication Media

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this module, you will be able to –

- Attend to team meetings on time as scheduled.
- Clearly express own opinions and listen to those of others without interruption.
- Consistent meeting of inputs with the meeting purpose and establishes ***protocols.***
- Conduct ***workplace interactions*** in a courteous manner.
- Ask and respond to questions about simple routine workplace procedures and maters concerning working conditions of employment.
- Interpret and implement meetings outcomes based on work place guideline.

4. Communication Media

It's important for employers to teach employees communication skills. By offering classes, setting up interventions, and starting a campaign to educate employees in the workplace, employers can see many benefits. With the correct business communication activities, the work environment will become more desirable for employees, productivity will improve, and the retention of important workers will increase. In addition, barriers to business communication can be overcome.

4.1 Types of communication medium

- Physical media
- Mechanical media

Physical media

With physical media we mean channels where the person who is talking can be seen and heard by the audience. The whole point here is to be able to not only hear the messages but also to see the body language and feel the climate in the room. This does not need to be two-way channels. In certain situations, the receiver expects physical communication. This is the case especially when dealing with high concern messages, e.g. organizational change or downsizing. If a message is perceived as important to the receiver, they expect to hear it live from their manager.

- ✓ Large meetings, town hall meetings
- ✓ Department meetings (weekly meetings)
- ✓ Up close and personal (exclusive meetings)
- ✓ Video conferences
- ✓ Viral communication or word of mouth

Large meetings

Large meetings have got great symbolic value and should be used only at special occasions. This channel works very well when you need to get across strategic and important messages to a large group of people at the same time, creating a wide attention, get engagement or communicate a sense of belonging. Large meetings are excellent when you want to present a new vision or strategy, inform about reorganization or share new values. The opportunity for dialogue is limited at large meeting, of course but you can create smaller groups where dialogue can be performed.

Weekly departmental meetings

In the weekly meetings you and your group communicate daily operative issues, gives status reports and solves problems. Weekly meetings are also used to follow up on information from large meetings, management team meetings etc from a "what's-in-it-for-us-perspective". This type of smaller group meetings gives good opportunities for dialogue. This channel is often the most important channel you have as a manager, because that's where you have the opportunity to build the big picture, you can prepare for change, you can create ownership of important strategies and goals etc. This is a favorite among the types of communication medium.

Up close and personal

This is a form of meetings where, often, a senior manager meets with a "random" selection of employees to discuss and answer questions. Some managers use this as a ongoing activities on a monthly basis. It can also be used in specific projects or campaigns e.g. launching new strategies.

Viral communication

Or viral marketing as it is also called works external as well as internal and refer to marketing techniques that use pre-existing social networks to produce increases in awareness or knowledge through self-replicating viral processes. It can be word-of-mouth delivered or enhanced by the network effects of social media.

Mechanical media

The second of the two types of communication medium is mechanical media. With mechanical media we mean written or electronic channels. These channels can be used as archives for messages or for giving the big picture and a deeper knowledge. But they can also be very fast. Typically, though, because it is written, it is always interpreting by the reader based on his or her mental condition. Irony or even humor rarely travels well in mechanical channels.

- ✓ E-mail
- ✓ Weekly letters or newsletters
- ✓ Personal letters
- ✓ Billboards
- ✓ Intranet
- ✓ Magazines or papers
- ✓ SMS

- ✓ Social media

E-mail

E-mail is a good channel for the daily communication to specific target groups. It is suitable mainly for up-to-date and "simple" messages and where there is no risk of misunderstanding, E-mail is an important supplement to weekly meetings and the intranet. Invitation to and agenda for meetings can with advantage be sent out with e-mail before the meeting, while background facts and minutes from meetings is well suited to be stored on the intranet.

Some short E-mail tips:

- Right short and straight to the point.
- Target your messages to the audience and avoid sending unnecessary all-employees-e-mails.
- Set up your subject line to describe what the e-mail is about.
- Clearly state if the message is for information or for action.
- Avoid attaching large documents if possible. Post a link or direct to the source instead.

Weekly letters

Managers that have large groups of employees and who has difficulties in meeting all of them often choose to publish a personally weekly letter. It is sort of a short summary of news with personally reflections. Many employees often appreciate it because it has the potential to give the "what's-in-it-for-us" angle. They can also contain summaries and status in tasks, projects or issues – yesterday, today and tomorrow.

Personal letters

At special occasions it can be justified to send a personal letter to employees in order to get attention to a specific issue. E.g. pat on the back letter after extra ordinary achievements. Or it can be a letter with your personal commentary on an ongoing reorganization that affects many employees. One other example is a letter that summarizes the past year and wishes all the best for the holidays.

Billboard

One of the most forgotten types of communication medium is clearly the billboard. Especially today, when everything is about social media. But the good thing with the billboard is that you can use billboards to inform people who do not have computers and/or access to the intranet or to reach people that work part time and does not attend weekly meetings.

- ✓ News summary
- ✓ Weekly letters
- ✓ Minutes from meetings
- ✓ Schedules
- ✓ Holiday lists

You can also use the billboard to gather ideas e.g. for items for upcoming meetings

Intranet

The intranet is of course one of the most used types of communication medium and a very important communication channel and work tool for you as a manager, but it is also your job to help your employees' priorities and pick out the information on the intranet, as well as translating messages into local consequences. Ask yourself: what information concerns you employees? In what way are they concerned? How do I best communicate this to my employees? Weekly meeting or your weekly letter can be a suitable channel to discuss or inform of information found on the intranet.

Employee magazine

A Magazine offers the opportunity to deepen a specific issue, explain context, describing consequences or tell a story. It also has the opportunity to reach many employees. If you want to create a broad internal understanding of strategic messages the magazine can be a good vehicle to use e.g. by writing an article based on an interview with you. As were the case with the intranet you also have to "translate" the information in the magazine to your employees. You can ask yourself: What does the content in a specific article mean to us? How shall I best communicate it to the employees?

SMS

Or text messaging to the mobile phone is one of the new types of communication medium and not a very widely used channel but where it is used it is proven very effective. Some companies use it as an alert system e.g. for giving managers a head start when something important will be published on the Intranet. The advantage with Sms is that it is fast. But it should be used rarely as an exclusive channel. Some companies use it as a subscription tool where you can subscribe to press releases.

Social Media

Social media is a “Media designed to be disseminated through social interaction, created using highly accessible and scalable publishing techniques. Social media supports the human need for social interaction, using Internet- and web-based technologies to transform broadcast media monologues (one to many) into social media dialogues (many to many). It supports the democratization of knowledge and information, transforming people from content consumers into content producers. Businesses also refer to social media as user-generated content (UGC) or consumer-generated media (CGM).”

More and more companies are using social media in their external marketing, setting up twitter and Facebook accounts etc. But these channels are also used internal where managers become “friends” on Facebook with their employees or where managers use blog and twitter targeting their employees.

Push or Pull

You can also divide the different types of communication medium in Push or Pull channels.

Push channels are channels where the sender is pushing the message to the receiver. Meaning it is up to the sender to control the communication.

- E-mail
- Newsletters and letters (if sent out)
- Magazines (if sent out)
- Meetings
- Telephone
- Sms

Pull channels on the other hand is when the receiver is pulling the message from the sender. It is up to the receiver when he or she wants to take in the message.

- Intranet
- Billboards
- New letters and letters (if not sent out)
- Magazines (if not sent out)
- Social media

Push channels are often regarded as having higher reliability than pull channels because of the fact that it is more active in the communication.

Self-Check 1

Name: _____ Date: _____

Instruction: Answer all the questions listed below, if you have some clarifications- feel free to ask your teacher.

I. Direction: Fill in the blanks with the correct answer.

_____ 1. It uses written or electronic channels.
_____ 2. It is the channel where the person who is talking can be seen and Heard by the audience.
_____ 3. It is channels where the sender it controls the communication.
_____ 4. It is channels where it is up to the receiver when he or she wants to Take in the message.
_____ 5. SMS belongs to what kind of channels?
_____ 6. Billboard belongs to what kind of channels?
_____ 7. Which channels are often regarded as having higher reliability?

II. Enumeration: Enumerate the following:

- Give at least 2 examples of a pull channels
  1.
  2.

- Give at least 2 examples of a push channels
  1.
  2.

- Give at least 2 examples of a physical media
  1.
  2.

- Give at least 2 examples of a mechanical media
  1.
  2.

Note: You need to get at least 12 points to pass

Answer Sheet-Unit Four
Self-Check 1

:I.

1. Mechanical media
2. Physical Media
3. Push Channels
4. Pull Channels
5. Push Channels
6. Pull Channels
7. Push Channels

II.

1. Intranet
2. Billboards
3. New letters and letters (if not sent out)
4. Magazines (if not sent out)
5. Social media

1. E-mail
2. Newsletters and letters (if sent out)
3. Magazines (if sent out)
4. Meetings
5. Telephone
6. SMS

1. Large meetings, town hall meetings
2. Department meetings (weekly meetings)
3. Up close and personal (exclusive meetings)
4. Video conferences
5. Viral communication or word of mouth

1. E-mail
2. Weekly letters or newsletters
3. Personal letters
4. Billboards
5. Intranet
6. Magazines or papers
7. SMS
8. Social media

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