

FUNDAMENTALS OF COMPUTING & COMPUTER PROGRAMMING

UNIT III

PROBLEM SOLVING AND OFFICE AUTOMATION

Planning the Computer Program – Purpose – Algorithm – Flow Charts – Pseudocode
-Application Software Packages- Introduction to Office Packages (not detailed commands for examination).

2 MARKS

1. What is a program?

A **program is a set** instruction written to carryout a particular task, so that computer can perform some specified task.

2. What is algorithm?

(JAN 2009)

Algorithm means the logic of a program. It is a step-by-step description of how to arrive at a solution of a given problem.

3. What are the steps to solve the problem in a computer system?

- Problem must be analyzed thoroughly.
- Solution method is broken down into a sequence of small tasks.
- Based on this analysis, an algorithm must be prepared to solve the problem.
- The algorithm is expressed in a precise notation. This notation is known as “Computer Program”.
- The Computer program is fed to the computer.
- The instruction in the program executes one after another and outputs the expected result.

4. How can you measure the quality of algorithm?

The primary factors that are often used to judge the quality of an algorithm are time requirement, memory requirement, and accuracy of solution.

5. What are the characteristics of an algorithm?

1. In algorithms each and every instruction should be precise.
2. In algorithms each and every instruction should be unambiguous.
3. The instructions in an algorithm should not be repeated infinitely.
4. Ensure that the algorithm will ultimately terminate.
5. The algorithm should be written in sequence.
6. It looks like normal English.
7. The desired result should be obtained only after the algorithm terminates.

6. How many types the Algorithm can be represented?

- Normal English
- Program
- Flowchart
- Pseudo code
- Decision table

7. What is decision table?

A decision table is a table containing the selection of conditions to be tested and how those conditions should be nested to arrive at the proper action.

8. What is Flowchart?

A Flowchart is a pictorial representation of an algorithm. It is often used by programmer as a program planning tool for organizing a sequence of step necessary to solve a problem by a computer.

9. What is the need of Flowchart symbols?

Each symbol of different shapes denotes different shapes denote different types of instructions. The program logic through flowcharts is made easier through the use of symbol that has standardized planning.

10. What is pseudo code?

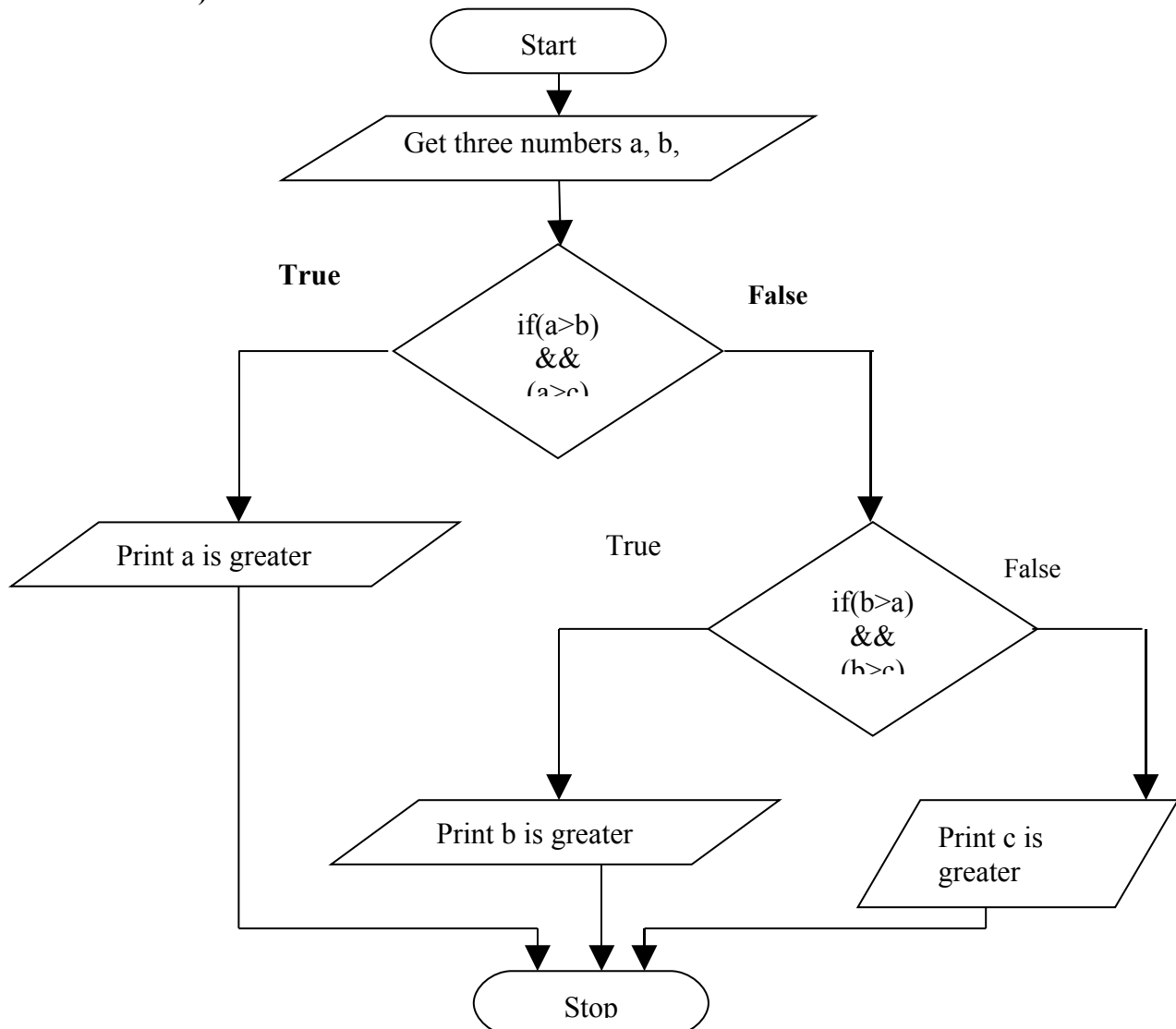
“Pseudo” means imitation of false and “code” refers to the instruction written in the programming language. Pseudo code is programming analysis tool that is used for planning program logic.

11. What is structured programming?

A structured programming is a more specific approach to solve a programming problem by using only the three basic logic structures. They are sequence logic, selection logic and Iteration logic.

12. Draw the flowchart to find the maximum among three numbers

(JAN 2009)



13. What are the rules for drawing a flowchart?

- The standard symbols should only be used.
- The arrowheads in the flowchart represent the direction of flow of control in the problem.
- The usual direction of the flow of procedure is from top to bottom or left to right.
- The flow lines should not cross each other.
- Be consistent in using names and variables in the flowchart.
- Keep the flowchart as simple as possible.
- Words in the flowchart symbols should be common statements and easy to understand.
- Chart main line of logic, and then incorporate all the details of logic.
- If a new page is needed for flowcharting, then use connectors for better representation.
- Don't chart every details or the flowchart will only be graphical represented.

14. What is sequence logic?

Sequence logic is used for performing instructions one after another in a sequence.

15. What is selection logic?

Selection logic is used for selecting the process path out of two or more alternative paths in the program logic. It uses three control structures called if...then, if...then...else and switch...case.

16. What is Iteration logic?

Iteration logic is used for producing loops in program logic when one or more instructions may be executed several times depending on some condition. It uses two control structures called do...while, and repeat...until.

17. What are the rules for writing pseudo code?**(MAY 2010)**

- Write one statement per line.
- Capitalize initial keywords.
- Indent to show hierarchy.
- End multi line structure.
- Keep statements language independent.

18. What are the features of word processors?

- Fast
- Permanent storage
- Formatting
- Editing
- Graphics
- OLE
- Spell Check
- Mail merge

19. How many types a document can be viewed?

- | | |
|----------------|--------------------|
| * Normal view | * Online layout |
| * Outline view | * Page layout view |

20. What are the menus available in Ms-Word?

- File
- Edit
- View
- Insert

- Format
- Tools
- Table
- Window
- Help

21. What is meant by Formatting?

Formatting is the process of changing the appearance of the text in the document.

22. Specify any five toolbars available in Ms-Word?

- Standard
- Formatting
- Drawing
- Tables & Borders
- WordArt etc.,

23. How many Line Spacing options available in Ms-Word?

- Single
- 1.5 Lines
- Double
- At least
- Exactly
- Multiple

24. What are the Text cases available in Ms-Word?

- Sentence case
- lower case
- UPPER CASE
- Title Case
- tOGGLE CASE

25. What is Subscript and Superscript?

The Subscript format places the text slightly below a line of normal printed text.

Eg:-H₂O

The Superscript format places the text slightly above a line of normal printed text.

Eg:-A²+B²

26. What is Tab and what are the Tab settings available in word?

Tab is used to control the alignment of text with in the document. Word provides seven types of tabs.

- Standard (left) tab
- Center tab
- Right tab
- Decimal tab
- Bar tab
- First line Indent tab
- Hanging Indent tab

27. Define Headers and Footers.

Header allows text, page number or section titles to appear on every page of document at the top position.

Footer allows text, page number or section titles to appear on every page of document at the bottom position.

28. What is a Table?

A Table is grid of rows and columns.

29. What is a Clipart?

Clipart is the attractive pre-defined, pre-colored pictures available in Ms-Word office suite.

30. Define a Template.

Template is a special kind of document that produces basic tools for shaping a final document.

31. Define operator and formula.

Operator:-An operator is a symbol, which can do a particular action on the operands.

Formula:-Is the mathematical expression used to carryout a particular process.

32. What is a function?

A function is a built-in mathematical shortcut used to perform a complex formula task.

33. What are the types of functions available in Excel?

There are nine types of functions available in Excel.

- Financial functions
- Date and Time functions
- Math and Trigonometry functions
- Database functions
- Statistical functions
- Text functions
- Lookup Reference functions
- Logical functions
- Information functions

34. What is a Label?

A label is the name describing the each column and row of a cell. It appears at the left and the top of a cell.

12 MARKS

1. Explain the steps involved in developing a program with neat diagram? (FEB2009)

(or)

Brief about planning the computer program?

The Programming Process – Purpose

1. Understand the problem

- ❖ Read the problem statement
- ❖ Question users
- ❖ Inputs required
- ❖ Outputs required
- ❖ Special formulas
- ❖ Talk to users

2. Plan the logic

(a) *Visual Design Tools*

- ❖ Input record chart
- ❖ Printer spacing chart
- ❖ Hierarchy chart
- ❖ Flowchart

(b) *Verbal Design Tools*

- ❖ Narrative Description
- ❖ Pseudocode

3. Code the program

- ❖ Select an appropriate programming language
- ❖ Convert flowchart and/or Pseudocode instructions into programming language statements

4. Test the program

1. Syntax errors
2. Runtime errors
3. Logic errors
4. Test Data Set

5. Implement the program

- Buy hardware
- Publish software
- Train users

6. Maintain the program

- Maintenance programmers
- Legacy systems
- Up to 85% of IT department budget

2. Explain flowchart in detail? (FEB 2009/FEB 2010)

Definitions:

A flowchart is a schematic representation of an algorithm or a stepwise process, showing the steps as boxes of various kinds, and their order by connecting these with arrows. Flowcharts are used in designing or documenting a process or program.

A flow chart, or flow diagram, is a graphical representation of a process or system that details the sequencing of steps required to create output. A flowchart is a picture of the separate steps of a process in sequential order.

The benefits of flowcharts are as follows:

- a. **Communication:** Flowcharts are better way of communicating the logic of a system to all concerned.

- b. **Effective analysis:** With the help of flowchart, problem can be analyzed in more effective way.
- c. **Proper documentation:** Program flowcharts serve as a good program documentation, which is needed for various purposes.
- d. **Efficient Coding:** The flowcharts act as a guide or blueprint during the systems analysis and program development phase.
- e. **Proper Debugging:** The flowchart helps in debugging process.
- f. **Efficient Program Maintenance:** The maintenance of operating program becomes easy with the help of flowchart. It helps the programmer to put efforts more efficiently on that part.

Advantages

- Logic Flowcharts are easy to understand. They provide a graphical representation of actions to be taken.
- Logic Flowcharts are well suited for representing logic where there is intermingling among many actions.

Disadvantages

- Logic Flowcharts may encourage the use of GoTo statements leading to software design that is unstructured with logic that is difficult to decipher.
- Without an automated tool, it is time-consuming to maintain Logic Flowcharts.
- Logic Flowcharts may be used during detailed logic design to specify a module.
- However, the presence of decision boxes may encourage the use of GoTo statements, resulting in software that is not structured. For this reason, Logic Flowcharts may be better used during Structural Design.

LIMITATIONS OF USING FLOWCHARTS

Complex logic: Sometimes, the program logic is quite complicated. In that case, flowchart becomes complex and clumsy.

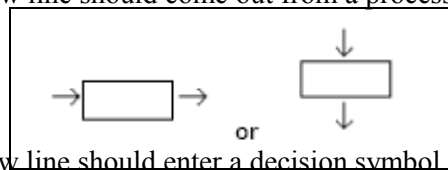
Alterations and Modifications: If alterations are required the flowchart may require re-drawing completely.

Reproduction: As the flowchart symbols cannot be typed, reproduction of flowchart becomes a problem.

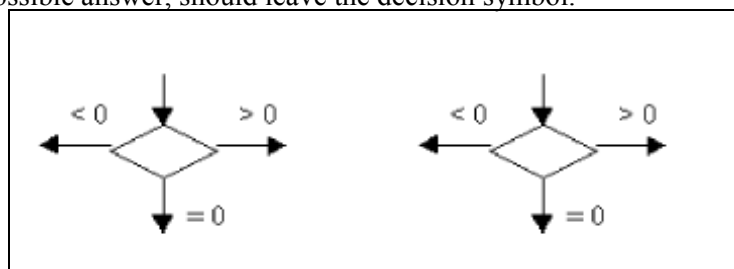
The essentials of what is done can easily be lost in the technical details of how it is done.

GUIDELINES FOR DRAWING A FLOWCHART

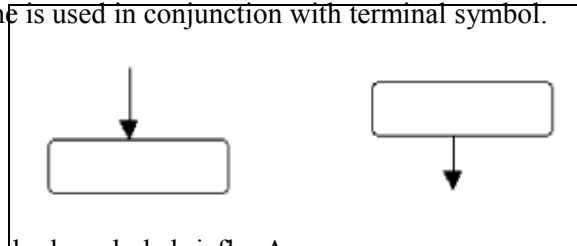
- a. In drawing a proper flowchart, all necessary requirements should be listed out in logical order.
- b. The flowchart should be clear, neat and easy to follow. There should not be any room for ambiguity in understanding the flowchart.
- c. The usual direction of the flow of a procedure or system is from left to right or top to bottom.
- d. Only one flow line should come out from a process symbol.



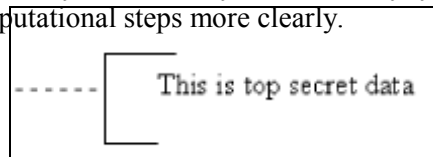
- e. Only one flow line should enter a decision symbol, but two or three flow lines, one for each possible answer, should leave the decision symbol.



f. Only one flow line is used in conjunction with terminal symbol.



g. Write within standard symbols briefly. As necessary, you can use the annotation symbol to describe data or computational steps more clearly.



h. If the flowchart becomes complex, it is better to use connector symbols to reduce the number of flow lines. Avoid the intersection of flow lines if you want to make it more effective and better way of communication.

i. Ensure that the flowchart has a logical *start* and *finish*.

j. It is useful to test the validity of the flowchart by passing through it with a simple test data.

3. Describe in detail about algorithm? Give example (MAY 2009)

An algorithm is a description of a procedure which terminates with a result.
Simple algorithms can be implemented within a function.

Properties of an algorithm

- No ambiguity
- There should not be any uncertainty about which instruction to execute next.
- The algorithm should conclude after a finite number of steps.
- The algorithm should be general.

Example:

- Biggest among two numbers
- Addition of N numbers
- Finding Factorial of a number
- Finding Fibonacci series.

4. Elaborate pseudo code with example. (MAY 2009\FEB 2009)

Guidelines

- Statements should be in simple English
- Must produce a solution for the specified problem
- It should be concise
- Each instruction should be written in separate line and express one action.
- Capitalize keywords such as READ, PRINT and so on.
- Instruction should be written from top to bottom, with one entry and one exit.
- Should allow easy transition from design to coding in programming language.

Benefits:

- Language Independent.
- Easy to develop a program from pseudo code than flowchart.
- Easy to translate into programming language.
- It is compact.

Limitations:

- No visual representation of program logic
- No accepted standards for writing pseudo codes.
- Cannot be compiled or executed.
- No real form or syntax rules.

Examples:

- Finding a number is prime or not

5. Discuss about the program control structure and program paradigms in detail.

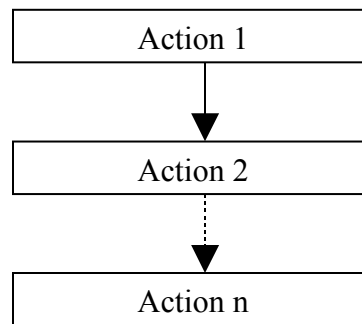
Program structures that affect the order in which statements are executed or that affect statements are executed are called control structures.

1. Sequence control structure

Instructions has to follow one another in a logical progression is sequence control structure.

Example:

Addition of two numbers

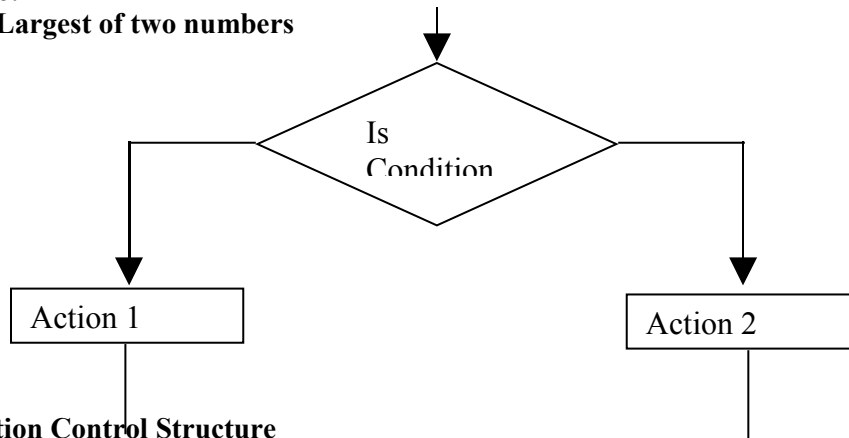


2. Selection Control Structure

Selection control structure allows the program to make a chance between alternate paths, when it is true or false.

Example:

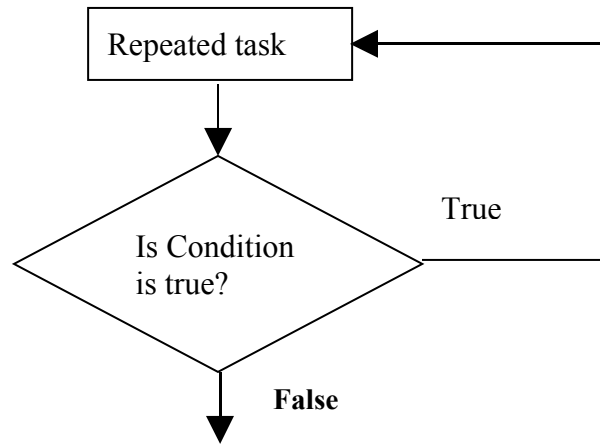
Largest of two numbers



3. Repetition Control Structure

Directs the system to loop back to a previous statement in the program, repeating the same sequence over and again, usually with a new data. When a sequence of statements is repeated against a condition, it is said to a loop.

Example: Search a number in array



6. Explain in detail about the word processing package.

(OR)

Explain 8 formatting features in word processing package. (JAN 2009/MAY 2009)

- (1) Paragraph
- (2) Font
- (3) Bullets and Numbering
- (4) Borders and Shading
- (5) Tabs
- (6) Change case
- (7) Auto format
- (8) Background

7. Describe about spreadsheet packages.

(OR)

Explain the formatting features in spreadsheet package. (JAN 2009/MAY 2009)

- (1) Cells
- (2) Rows
- (3) Columns
- (4) Auto format
- (5) Sheet
- (6) Conditional formatting
- (7) Style

8. Discuss about the graphics package along with its various features in detail.

(OR)

Explain 8 formatting features in graphics package. (JAN 2009/MAY 2009)

- (1) Fonts
- (2) Bullets and Numbering
- (3) Alignment
- (4) Line spacing
- (5) Change case
- (6) Replace fonts

- (7) Slide Design
- (8) Slide Layout

9. Briefly explain about the personal assistant package.

- Address book
- Calendar
- To-do List
- Inventory Books
- Investments Book