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Fundamental of Programming

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DIGITAL LEARNING CONTENT

CHAPTER-2

INTRODUCTION TO C PROGRAMMING

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FEATURES OF C LANGUAGE

- Simple
- Machine Independent or Portable
- Mid-level programming language
- structured programming language
- Rich Library
- Memory Management
- Fast Speed
- Pointers
- Recursion
- Extensible

STRUCTURE OF C PROGRAM

Documentation – comments about program

Link- instructions to compiler

Definition- defines all symbolic constants

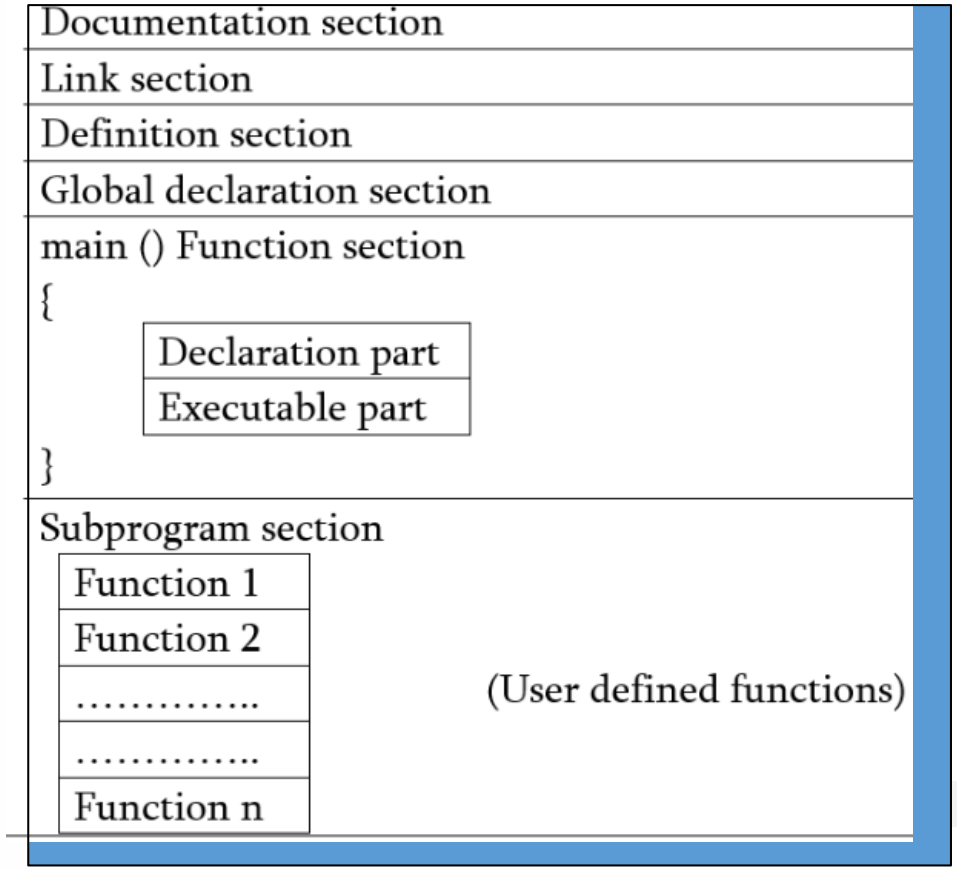
Global declaration- variable that is frequently used

Main()-

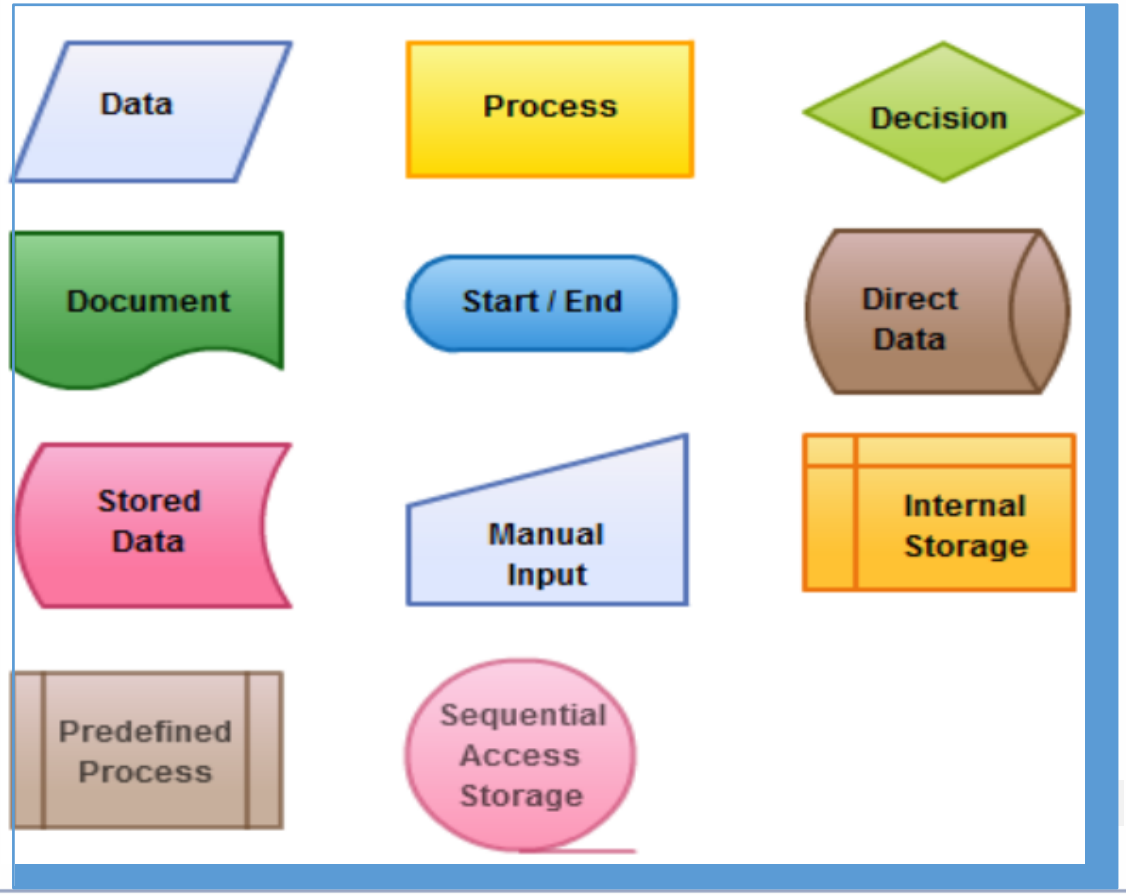
Declaration: all variables

Execution: programming

Subprogram- user defined functions



FLOW CHARTS


Data
Process
Decision
Document
Start / End
Direct Data
Stored Data
Manual Input
Internal Storage
Predefined Process
Sequential Access Storage

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Guidelines for drawing a flow chart

- All necessary requirements should be listed out in a logical order.
- There should be a logical start and end.
- Easy to follow by non-technical person.
- Direction has to be from left to right and top to bottom.
- Only one flow line should emerge from process symbol.
- Only one flow line should enter decision symbol but atleast two decision lines should come out.
- Only one flow line at terminal and beginning.
- Writing has to be brief.

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Advantages of flow chart

- Communication
- Effective analysis
- Proper documentation
- Efficient coding
- Proper debugging
- Efficient program maintenance

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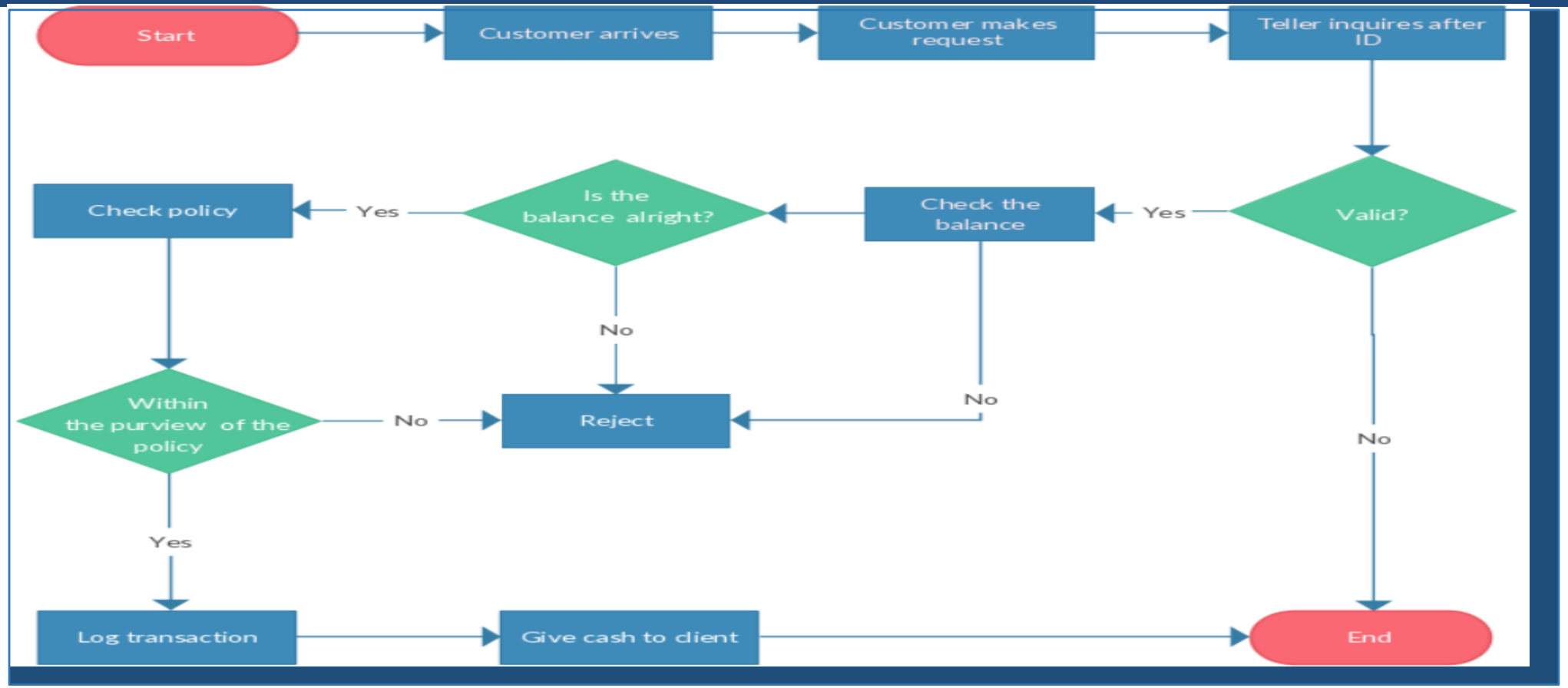
Limitation of flow chart

- Complex logic
- Alterations and modifications
- Reproductions

Example


Start
Customer arrives
Customer makes request
Teller inquires after ID
Valid?
Yes
Check the balance
Is the balance alright?
Yes
Check policy
Within the purview of the policy
No
Reject
No
No
No
Yes
Log transaction
Give cash to client
End

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Algorithm

- Programs=algorithms+data
- An algorithm is a part of computer program; an algorithm is an effective procedure for solving a problem in a finite number of steps.
- It is a complete step by step representation of the solution to a problem.

How to design an algorithm?

Step-1: Investigation

- Identify process
- Identify major decisions
- Identify loops
- Identify variables

Step-2: Preliminary algorithm

- Devise high level algorithm
- Walk-through algorithm. If any problem occurs then correct it.

Step-3: Refining the algorithm

- Incorporate any refinements from step 2
- Group process
- Group variables
- Teat algorithm again

Example: find sum of two numbers

1. Read value of a
2. Read value of b
3. Add a and b
4. Display the summation

Types of error

- Runtime Errors

C runtime errors are those errors that occur during the execution of a c program and generally occur due to some illegal operation performed in the program.
Examples of some illegal operations that may produce runtime errors are:

- Dividing a number by zero
- Trying to open a file which is not created
- Lack of free memory space

Cont.

- Compile Errors

Syntax error: When the rules of the c programming language are not followed, the compiler will show syntax errors.

int a,b: (wrong)
int a,b; (correct)

Semantic error: Semantic errors are reported by the compiler when the statements written in the c program are not meaningful to the compiler.

b+c=a; (wrong)
a=b+c; (correct)

Cont.

- Logical Errors

Logical errors are the errors in the output of the program

The presence of logical errors leads to undesired or incorrect output

Caused due to error in the logic applied in the program to produce the desired output

Also, logical errors could not be detected by the compiler, and thus, programmers has to check the entire coding of a c program line by line.

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