SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE NAME : 20CS101-PROGRAMMING FOR PROBLEM SOLVING

I YEAR /I SEMESTER

Unit 2- C-Programming Basics

Topic 2:Fundamental rules – Structure of a 'C' program – Compilation and Linking processes

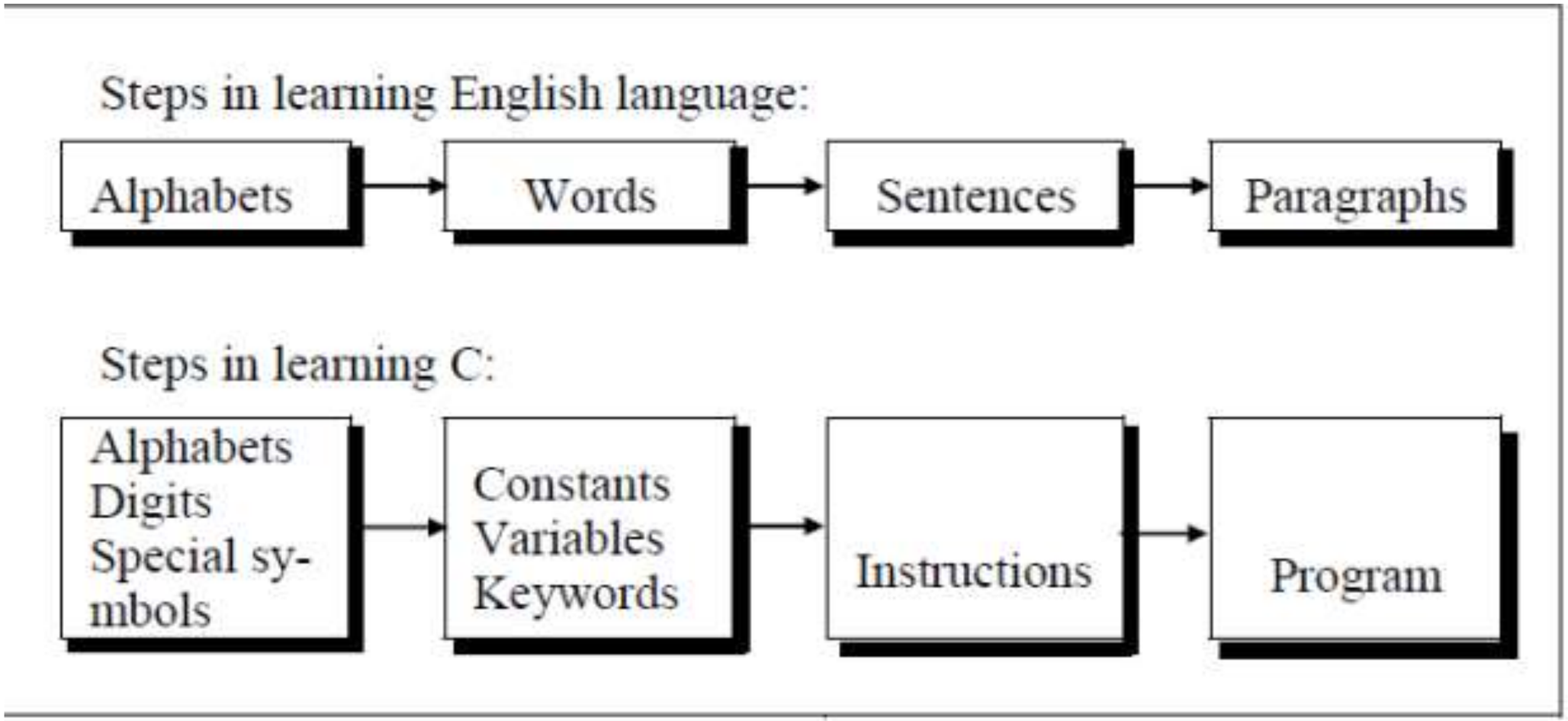
II unit C PROGRAMMING BASICS

Introduction to ‘C’ Programming –Fundamental rules – Structure of a ‘C’ program – Compilation and Linking processes –Constants, Variables, keywords, Identifier, Delimiters – Declaring and Initializing variables – Data Types – Operators and Expressions –Managing Input and Output operations – Decision Making and Branching –Looping statements – Illustrative programs.

I unit Problem solving techniques

The following steps are performed while solving a problem:

1. Analyse the given problem.
2. Divide the process used to solve the problem in a series of elementary tasks.
3. Formulate the algorithm/pseudo code/flow chart to solve the problem.
4. Express the algorithm as a precise notation, which is known as a computer program.
5. Feed the computer program in the computer. CPU interprets the given program, processes the data accordingly, and generates the result.
6. Send the generated result to the output unit, which displays it.


Steps in learning English language:
Alphabets
Words
Sentences
Paragraphs
Steps in learning C:
Alphabets
Digits
Special sy-
mbols
Constants
Variables
Keywords
Instructions
Program

Applications

- ✓Developing Operating Systems
- ✓Building Databases
- ✓Designing Compilers
- ✓Graphical User Interface
- ✓Game and Animation

✓C language Job opportunities

- ✓Embedded system engineer
- ✓C developer
- ✓System programmer
- ✓Network programmer
- ✓Firmware engineer
- ✓Test engineer

Fundamental rules of C

✓**Variables**

Variables must be declared before they are used in executable statements.

C is a case sensitive, the upper case and lower case considered differently

Variable names cannot start with numbers.

Variable names cannot contain keywords.

Variable names cannot contain white spaces.

Variable names can contain letters, numbers, and the underscore character (_).

Functions

Functions are sets of statements that take inputs, perform calculations, and produce outputs. Functions are the building blocks of C programs. Functions can be called multiple times, which allows for reusability and modularity.

Main function

The main function is the entry point of a C program, where the program execution begins. The main function returns an integer value that indicates the program's success or failure.

Header files

Header files organize code, provide function prototypes, and facilitate code reuse. They are especially important for large projects.

Structure of C Language program

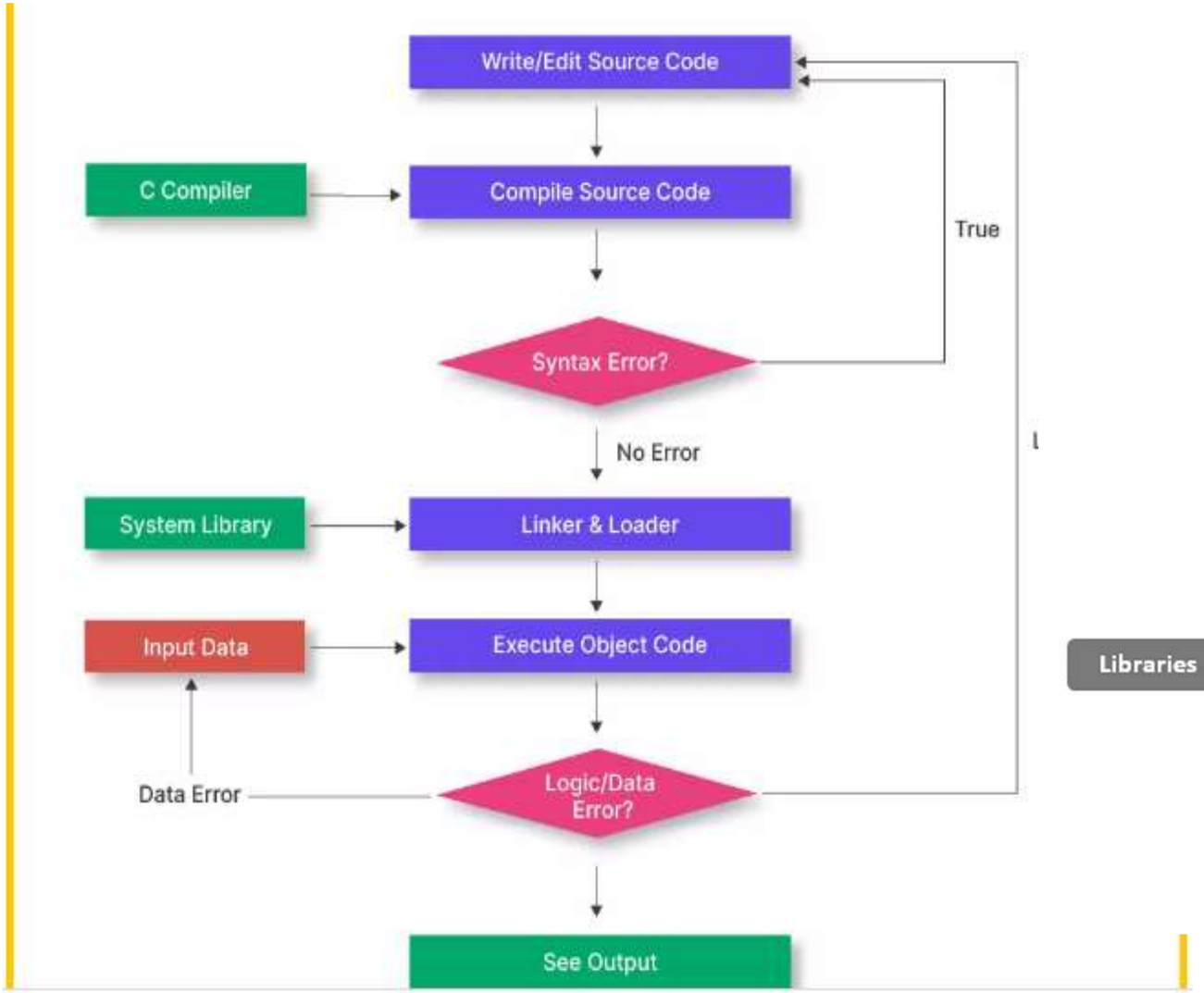
Documentation section
Preprocessor directives
Global variable/function declaration
main function( )
{
Local variables;
Statements;
}

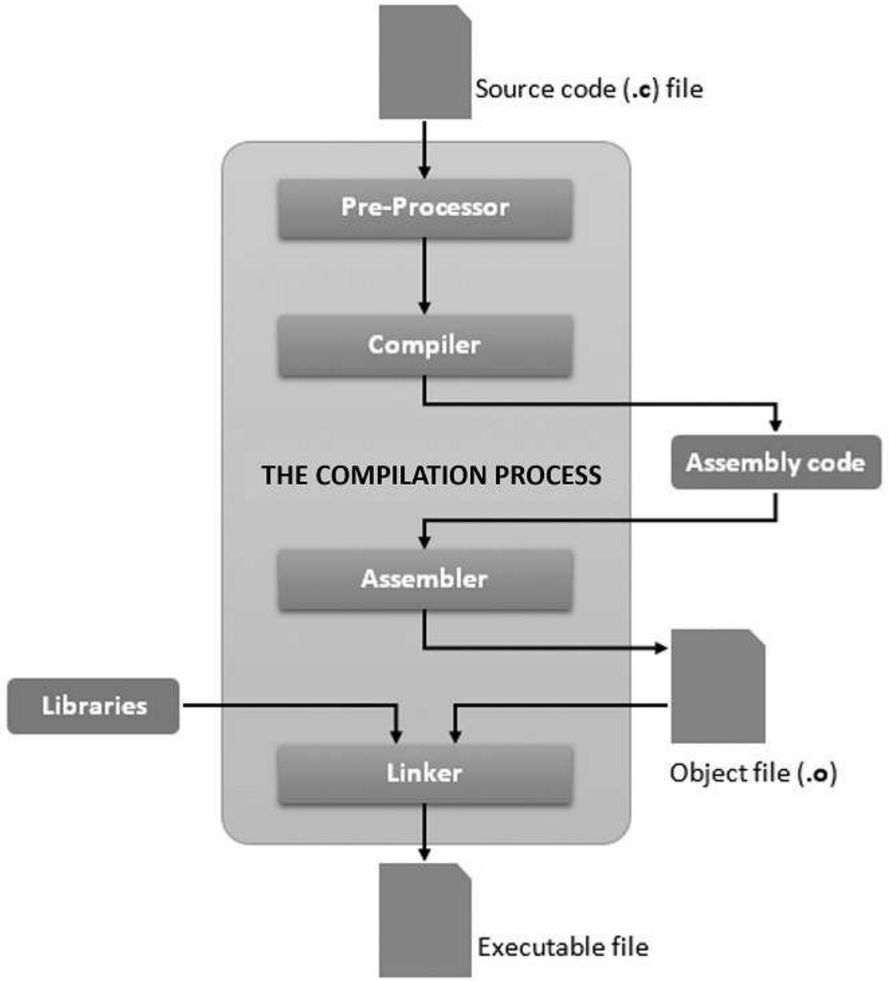
User defined function
{ Local variables;
Statements;
}

```
/* my first program in C */
#include <stdio.h>
 #include <math.h>
 //forward declaration//
 float area_of_square(float);
 /*main function*/
 void main()
{
 float side = 5.50;
 float area = area_of_square(side);
 printf ("Side=%5.2f Area=%5.2f", side, area);
  }
/*subroutine*/
 float area_of_square(float side)
{
float area = pow(side,2);
 return area;
 }
```

Result:Side= 5.50 Area=30.25

Compilation and Linking





Execution Flow

- C program (source code) is sent to preprocessor first. The preprocessor is responsible to **convert preprocessor directives into their respective values**. The preprocessor generates an expanded source code.
- Expanded source code is sent to compiler which compiles the code and converts it into assembly code.
- Example:**#include <stdio.h>** includes the **standard input output** library functions. The printf() function is defined in stdio.h

Conti...

- The assembly code is sent to assembler which assembles the code and converts it into object code. Now a hello.obj file is generated.
- The object code is sent to linker which links it to the library such as header files. Then it is converted into executable code. A hello.exe file is generated.
- The executable code is sent to loader which loads it into memory and then it is executed. After execution, output is sent to console.

Assessment 1

1. Write about compilation and linking process of C Program?

Ans : ____

References

TEXT BOOKS

1.E.Balagurusamy, “Fundamentals of Computing and Computer Programming”, 2nd Edition Tata McGRaw-Hill Publishing Company Limited, (2012). (UNIT – I, II, III, IV, V)

2.Ashok.N.Kamthane,“ Computer Programming”, Pearson Education (India) (2010). (UNIT –II, III IV, V)

3.Reema Thareja, “Programming in C”, 2nd Edition, Oxford University Press,(2015). (UNIT –I,II, III, IV, V)

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1.Byron Gottfried, “Programming with C”, 2nd Edition, (Indian Adapted Edition), TMH Publications, (2006). (Unit II, III, IV)

2.Stephan G kochan, “Programming in C” Pearson Education (2008), (UNIT II, III, IV, V)

3.P.Sudharson, “Computer Programming”, RBA Publications (2008), (UNIT I, II, III, IV)

4.Yashavant P. Kanetkar. “Let Us C”, BPB Publications, 2014.(Unit II, III, IV, V)

5.Anita Goel and Ajay Mittal, “Computer Fundamentals and Programming in C”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011. (UNIT – I, II, III, IV, V)

Thank You