Structured Programming Language Sessional

CSE 1104

Sessional - 01

Basic Structure and Syntax of C Programming Language

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1 Introduction

C was initially used for system development work, in particular the programs that make up the operating system. C was adopted as a system development language because it produces code that runs nearly as fast as code written in assembly language. Some examples of the use of C might be:

- Operating Systems
- Language Compilers
- Assemblers
- Text Editors
- Print Spoolers
- Network Drivers
- Modern Programs
- Databases
- Language Interpreters
- Utilities

All the C programs are written into text files with extension ".c" for example hello.c. You can use "vi" editor to write your C program into a file.

A C program basically has the following form:

- Preprocessor Commands
- Functions
- Variables
- Statements & Expressions
- Comments

The following program is written in the C programming language. Open a text file **hello.c** using vi editor and put the following lines inside that file. **Code:**

```c
#include <stdio.h>
int main()
{
    /*My first program*/
     printf("Hello, World!\n");

     return 0;
}
```

Output:

```
Hello, World!
```

Preprocessor Commands: These commands tells the compiler to do preprocessing before doing actual compilation. Like # include <stdio.h> is a preprocessor command which tells a C compiler to include stdio.h file before going to actual compilation.

Functions: are main building blocks of any C Program. Every C Program will have one or more functions and there is one mandatory function which is called main() function. This function is prefixed with keyword int which means this function returns an integer value when it exits. This integer value is retured using return

statement.

The C Programming language provides a set of built-in functions. In the above example printf() is a C built-in function which is used to print anything on the screen.

Variables: are used to hold numbers, strings and complex data for manipulation.

Statements & Expressions: Expressions combine variables and constants to create new values. Statements are expressions, assignments, function calls, or control flow statements which make up C programs.

Comments: are used to give additional useful information inside a C Program. All the comments will be put inside /*...*/ as given in the example above. A comment can span through multiple lines.

1.1 Reserved Keywordss

The following names are reserved by the C language. Their meaning is already defined, and they cannot be re-defined to mean anything else.

auto	else	long	switch
break	enum	register	typedef
case	extern	return	union
char	float	short	unsigned
const	for	signed	void
continue	goto	sizeof	volatile
default	if	static	while
do	int	struct	_Packed
double			

While naming your functions and variables, other than these names, you can choose any names of reasonable length for variables, functions etc.

1.2 Datatypes

C has a concept of 'data types' which are used to define a variable before its use. The definition of a variable will assign storage for the variable and define the type of data that will be held in the location.

The value of a variable can be changed any time.

C has the following basic built-in datatypes.

- int
- float
- double
- char

There is not a boolean data type. C does not have the traditional view about logical comparison.

int - data type: int is used to define integer numbers.

```
{
    int Count;
    Count = 5;
}
```

float - data type: float is used to define floating point numbers.

```
{
    float Miles;
    Miles = 5.6;
}
```

double - data type: double is used to define BIG floating point numbers. It reserves twice the storage for the number. On PCs this is likely to be 8 bytes.

```
{
    double Atoms;
    Atoms = 2500000;
}
```

char - data type: char defines characters.

```
{
    char Letter;
    Letter = 'x';
}
```

1.3 Input and Output

- **Input:** In any programming language input means to feed some data into program. This can be given in the form of file or from command line. C programming language provides a set of built-in functions to read given input and feed it to the program as per requirement.
- **Output:** In any programming language output means to display some data on screen, printer or in any file. C programming language provides a set of built-in functions to output required data.

printf() function

This is one of the most frequently used functions in C for output. Try following program to understand printf() function.

Code:

```c
#include <stdio.h>

int main()
{
    int d = 5;
    char str [] = "abc";
    char ch = 's';
```

```
    float pi = 3.14;
    printf("%d %s %f %c\n", d, str, pi, ch);

     return 0;
}
```

Output:

```
5 abc 3.140000 s
```

Here %d is being used to print an integer, %s is being usedto print a string, %f is being used to print a float and %c is being used to print a character.

scanf() function

This is the function which can be used to to read an input from the command line. Try following program to understand scanf() function.

Code:

```
#include <stdio.h>

int main()
{
    int n;

    printf("Input an integer number: ");
    scanf("%d", &n);

    printf("Number= %d",n);

     return 0;
}
```

Output:

```
Input an integer number: 10
Number= 10
```

Here %d is being used to read an integer value and we are passing & test Integer to store the vale read input. Here & indicates the address of variable n.

This program will prompt you to enter a value. Whatever value you will enter at command prompt that will be output at the screen using printf() function. If you enter a non-integer value then it will display an error message.

2 Discussion & Conclusion

Based on the focused objective(s) to understand about the syntax of C programming, the additional lab exercise made more confident towards the fulfilment of the objectives(s).

3 Lab Task (Please implement yourself and show the output to the instructor)

1. Write a C program to display "This is my first C Program".
2. Write a C Program to display your Id, Name, Dept. Name and University Name followed by a newline.
3. Write a C program to add two numbers (2 and 6) and display its sum.
4. Write a C program to multiply two numbers (4 and 5) and display its product.

4 Lab Exercise (Submit as a report)

- Write a C program to add two numbers (5 and 8) and display its sum like (5 + 8 = 13).
- Write a C program to input two numbers and display those numbers.
- Write a C Program to input two numbers as input and display its sum.
- Write a C Program to input two numbers as input and display its product.
- Write a C Program to input two float numbers as input and display its sum [Follow the printing style of problem 5].

5 Policy

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