

14-12-2015



DOON UNIVERSITY, DEHRADUN  
End Semester Examination, First Semester, 2015  
School of Physical Sciences

Integrated M. Sc. Program (Physics/Chemistry/Mathematics)  
CSG-101: Introduction to Programming in C

Time Allowed: 3 Hours

Maximum Marks: 60

Note: Attempt All Questions from Sections A, B and C.

SECTION: A (Short Answer Type Questions)

(Total Marks: 12)

1. True/False (2)
  - a. In C, *sizeof* is a function.
  - b. Every loop in C must have a *break* and/or *continue* statement.
  - c. Every function in C must have a *return* statement.
  - d. Multiplication of two pointers is a valid pointer arithmetic operation.
  
2. What will be the output of the following programs? (2)
  - a. 

```
void main(){
    int a[5] = {0, 1, 2, 3, 4};    char c[] = "Z";
    printf("%d\t%c\t%s", a[2], (a+2)[2], c[0], c);
}
```
  - b. 

```
void main(){
    int a = 2, b = 3;
    printf("%d\t", a = b);
    printf("%d\t", a == b);
    printf("%d\t%d", a, b);
}
```
  
3. Combine the following pair of statements into a single C statement: (2)
  - a.  $x = *p;$        $p = p + 1;$
  - b.  $x = *p;$        $*p = *p + 1;$
  - c.  $p = p + 1;$      $x = *p;$
  - d.  $*p = *p + 1;$     $x = *p;$
  
4. Which operator has the lowest priority? (1)
5. '0' is a \_\_\_\_\_ whereas "0" is a \_\_\_\_\_. (1)

6. Choose the correct option(s). (2)

a. Which of the following is an invalid variable name?

A. id\_no1

B. \_idno1

C. idno1

D. idno.1

b. Which piece of code will print i 10 times?

A. for(i = 0; i <= 10; i++) printf("i");

B. for(i = 1; i <= 10; i++) printf("i");

C. for(i = 10; i >= 1; i++) printf("i");

D. for(i = 10; i > 0; i--) printf("i");

c. When you pass an array as an argument to a function, what actually gets passed?

A. address of the array

B. values of elements of the array

C. address of the first element of the array

D. number of elements of the array

d. Which header file includes file manipulation functions?

A. stream.h

B. files.h

C. stdio.h

D. stdlib.h

7. Write C statements, using fseek() function, to place the position pointer (corresponding to a FILE \*fp): (2)

a. At the beginning of the file.

b. At the end of the file.

c. 10 bytes backward from the current position.

d. 10 bytes forward from the beginning of the file.

**SECTION: B (Long Answer Type Questions)**

**(Marks: 6 x 4 = 24)**

**Attempt any 6 questions from Section B**

1. Explain the arithmetic, relational, logical and assignment operators in C. Mention their precedence level and associative property.
2. How does type conversion in assignment operation take place? Assuming variable 'x' to be of type *int*, how will the following expression be evaluated?
  - a.  $x = 5/4$
  - b.  $x = 5/4.0$
3.
  - a. Define a C function that takes an integer argument 'n' and returns the sum of first 'n' positive integers without using any loop.
  - b. Define a C function which accepts an array of 'n' integers and prints every third value of the array.
4. Define a C function which takes time in seconds as input and returns number of hours, minutes and seconds. Take time in seconds to be of type *long int*.
5. Define a C function to reverse a string. Use the following header to define the function:

```
void reverse_str(char ps[]){  
    ...  
}
```

Call this function from main() to check whether the string entered by the user is a palindrome or not.
6. Define a C function to compare two strings. Use the following header to define the function:

```
int compare_str(char *ps1, char *ps2){  
    ...  
}
```

Call this function from main() to compare two strings entered by the user.
7. Write short note on any two of the following:
  - a. `getchar()` and `putchar()`
  - b. `fgetc()` and `fputc()`
  - c. `fscanf()` and `fprintf()`
8.
  - a. Define a structure `RECTANGLE` with four integer fields viz., length, breadth, area and perimeter.
  - b. Declare a variable 'r' of type `RECTANGLE` inside main function and read in the length and breadth from the user in the respective fields of 'r'.
  - c. Define a C function that receives the address of a structure variable and computes the area and perimeter of the structure variable. Call this function from the main() and print the length, breadth, area and perimeter of 'r'.

**SECTION: C (Very Long Answer Type Questions)**

**(Total Marks: 24)**

1. 1) Explain the various loop statements in C with syntax and examples. (6 + 3)

2) What is the difference between *break* and *continue* statements? Where does the control get transferred to when a *continue* statement is encountered in *while*, *do-while* and *for* loops?

(Or)

1) Explain the difference between pointer to an array and array of pointers. Derive the expressions to access a 2D-array using: (6 + 3)

- a. Pointer to an array
- b. Array of pointers

2) Store the days of a week using either 2D-array of *char* or array of pointers to *char*. Accept a number between 1 and 7 from the user and output the corresponding weekday. (1 - Monday, 2 - Tuesday ...)

2. What is dynamic memory allocation? Explain the method of creating a 2D dynamic array with (7)

- a. fixed number of columns.
- b. fixed number of rows.
- c. variable rows and columns.

3. Consider the following BOOK structure and a global variable 'b' of type BOOK. (8)

```
typedef struct book{
    char name[10];        //name of the book
    int num_copy;        //number of copies
}BOOK;
BOOK b;
```

Write C functions to perform the following actions to maintain a database of books.

- a. Add one or more books.
- b. Sort the books in decreasing order of number of copies; if 2 or more books have same number of copies, sort the records on the basis of their names.
- c. Delete one or more books.
- d. Update the records of one or more books.