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Department of Computer Science and Engineering
1st Year 1st Semester B.Sc. (Engg.) Examination-2014
Course: CSE102 Title: Structured Programming

Full Marks:70 Time:4 hours

N.B.

i. Answer **SIX** questions, taking any **THREE** from each section.
ii. All questions are of **equal** values.
iii. Use separate answer script for each section.

Section A

1. a) What are the primitive data types used in C? Interpret the following variable declaration in gcc compiler: `int x;` $2+1\frac{2}{3}$

   b) Explain each part of the following program in C: 4

```
#include<stdio.h>
int main()
{
    int a,b,c;
    scanf("%d%d",&a,&b);
    c=a+b;
    printf("Summation of %d and %d is %d",b,a,c);
    return 0;
}
```

   c) How can an identifier be declared? 2

   d) How a floating point number is organized into memory? 2

2. a) How many times does "Hello" appear by the following program fragment? 2

```
int main()
{
  for(;;){
      printf("Hello");
   if(1) break;
  }
}
```

   b) Suppose, a, b, c are integer variables with initial value 10, 5 and 30 respectively. Find the value of c after execution of the following statement: 3

```
c += ( a > 0 && a < 10 ) ? a++ : a/b ;
```


   c) What will be the output of the following program: $3\frac{2}{3}$

```
int main()
{
     int i, j;
     for(i=1;i<5;i++){
          for(j=1;j<=i;j++){
               if(i==j)   printf("1");
               else   printf("0");
          }
          printf("\n");
     }
     return 0;
}
```

   d) Write the purpose of **continue** in a loop with an example. 3

3. a) What will be the output of the following code segment: 2

```
int main()
{
   int i, n;
   for(n=1;n<8;n++)
   {
      for(i=1;i<n;i++)
         printf("%d",8-i);
      printf("\n");
   }
}
```

   b) What is the difference between call by value and call by reference? Clarify it with example of each. $3\frac{2}{3}$

   c) Describe the memory representation of a two-dimensional array, `a[3][2]`. If the starting address is a, then what will be the address of `a[2][1]`? 2+2

   d) What is the output of the following statement? 2

```
printf("%d", !strcmp("push", "pull"));
```

4. a) Write a program to test a string as a palindrome. 4

   b) Illustrate the printed result of the following program:

```
int main(){
   int *pc,c;
   c=22;
   pc=&c;
   printf("%d\n",*pc);
   c=11;
   printf("%d\n",*pc);
   *pc=2;
```

```
    printf("Value of c: %d\n",c);
    return 0;
}
```

c) What is the difference between function prototype and function definition? 2

d) How many times does "Bangladesh" appear by the following program fragment? 2

```
int main()
{
    printf("Bangladesh");
    main();
}
```

Section B

5. a) What is the base criteria of a recursive function? 2

b) Write a program to calculate factorial using a recursive function and illustrate the execution of the function to calculate factorial 5. $3+3\frac{2}{3}$

c) Convert the following switch statement into if-else equivalent statement 3

```
int main()
{
   char grade;
   scanf("%c", &grade);

   switch(grade)
   {
      case 'A': printf("Excellent\n");
                break;
      case 'B':
      case 'C': printf("Well done\n");
                break;
      case 'D':
      case 'F': printf("Better try again\n");
                break;
      default : printf("Invalid grade\n");
   }
   return 0;
}
```


6. a) How does a structure differ from an array? $1\frac{2}{3}$

b) Define a structure type, ***struct book*** containing three member variables for book's title, author, and price. Using this structure write a program to read information for the book from the keyboard and print the same on the screen. 5

c) Define local, global and static variables with appropriate examples. 3

d) Illustrate structure padding with comprehensive examples and appropriate figures. 2

7. a) When do we use the following functions? 2
   i) free()
   ii) fclose()

b) Illustrate the printed result of the following program: 3

```
int main()
{
   int num=212,i;
   for (i=0;i<=2;++i)
      printf("%d\n",num>>i);
   for (i=0;i<=2;++i)
      printf("%d\n",num<<i);
   return 0;
}
```

c) Write a program to multiply two `n × k` and `k × m` matrices. $4\frac{2}{3}$

d) String can be read using both ***scanf()*** and ***gets()*** functions. Compare them critically and describe situations where one is superior to the others. 2

8. a) Describe the different modes by which data files can be opened in C. $4\frac{2}{3}$

b) Write a program to copy the contents of the *input.txt* file to the *output.txt* file. 5

c) Explain the usage of the functions `fread()` and `fwrite()`. 2