

Hitesh

Paper IT 11 – PROGRAMMING METHODOLOGY

Q 1 is compulsory.

Time: 3 hrs.

Attempt any 4 questions from Q2 to Q6.

Max Marks: 75

(Write your Roll No. on the top immediately on receipt of this question paper)

Q1. Explain following pointer declarations:

(15)

- `void (*f) (void (*)(int *, void **), int (*)(void **, int *));`
- `char (* (* x[3]) ()) [5];`
- `char (*(*p ()) []) ();`
- `const int * const * pcp;`
- `typedef int * (*fptr) (void *, int **);`

Q2.

- Briefly explain different phases through which C program passes before being transformed into executable form? Write the gcc option which will be used to analyse different phases?

(3)

- Provide the output of following:

(2)

```
#include<stdio.h>
int main(void)
{
    printf("%10s\n","India");
    printf("%4s\n","India");
    printf("%.2s\n","India");
    printf("%5.2s\n","India");
    return 0;
}
```

- What is meaning of off-by one error and falling through cases? Explain with example?

(3)

- In the following program how long will the for loop get executed?

(2)

```
#include<stdio.h>
int main(void)
{
    int i;
    for( ; scanf( "%d", &i ); printf( "%d\n", i );
    return 0;
}
```

- Explain different type of Storage classes with example? What four aspects of a variable is decided by storage class?

(5)

Q3.

- a. List the valid arithmetic operations that can be done on pointers? (2)
- b. What is dynamic memory allocation? Mention the functions used in dynamic memory management? Complete the following table: (5)

First Parameter	Second Parameter	Behaviour of realloc function
Null	NA	
Not null	0	
Not null	Less than original block's size	
Not null	Larger than original block's size	

- c. Provide the output of following program: (2)

```
#include<stdio.h>
int main(void)
{
    int i,arr[3][4] = {{10,11,12,13},{20,21,22,23},{30,31,32,33}};
    int *pa[3];
    int (*p)[4];
    p=arr;
    for(i=0; i<3; i++)
        pa[i]=arr[i];
    printf("%d %d %d\n",pa[0][0],pa[0][1],pa[2][3]);
    printf("%d %d %d\n",p[0][0],p[0][1],p[2][3]);
    return 0;
}
```

- d. Provide the output of following program: (2)

```
#include<stdio.h>
int main(void)
{
    char *ptr;
    ptr="My name is %s and age is %d\n";
    printf(ptr,"Aditi",32);
    return 0;
}
```

- e. What are command line arguments? Explain with example? Provide output of following program: (4)

```
#include<stdio.h>
int main(void)
{
    char str1[]="hockey";
    char str2[]="Cricket";
    char *const p=str1;
    *p='j';
    printf("ouput: %s\n",p);
    return 0;}
}
```

Q4.

- a. What are self referential structures? Give example. (2)
- b. Differentiate between structures and union? (2)

c. Provide the output of following:

(2)

```
#include<stdio.h>
#pragma pack(1)

struct
{
    char a[20]; ✓
    int b; ✓
    union
    {
        double c;
        struct
        {
            char d[15];
            float e;
        }x;
    }y;
}z;

int main(void)
{
    printf("%u %u %u\n", sizeof(z.y.x), sizeof(z.y), sizeof(z));
    return 0;
}
```

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d. What are advantages of using typedef? Give three different type of usage of typedef with structures? (4)

e. Differentiate between structure and union? (3)

f. Provide the output of following program: (2)

```
#include<stdio.h>
struct student {char name[20]; int age;};
int main(void)
{
    struct student stu1={"Anita", 10}, stu2={"Anita", 12};
    if(stu1 == stu2)
        printf("Same\n");
    else
        printf("Not same\n");
    return 0;
}
```

Q5.

a. What are Enumerations? Give example. Provide the output of following program: (4)

```
#include<stdio.h>
int main(void)
{
    enum month{Jan, Feb, Mar, Apr, May, Jun}m1, m2;
    m1=Mar;
    printf("m1=%d\n", m1);
    printf("Enter value for m2 : ");
    scanf("%d", &m2);
    printf("m2=%d\n", m2);
    return 0;
}
```

- b. What is scope of an identifier? Explain its various types with example. (4)
- c. What is lvalue and rvalue? Give example. (2)
- d. Provide the output of following program: (2)

```
#include<stdio.h>
int main(void)
{
    int x=0x1F;
    x=x<<2;
    printf("%d ",x);
    x=x>>2;
    printf("%d\n",x);
    return 0;
}
```

- e. Differentiate between macros and functions? Provide the output of following program. (3)

```
#include<stdio.h>
#define MACRO(x) if(x==0) printf("Out for a Duck\n")
int main(void)
{
    int runs=12;
    if(runs<100 )
        MACRO(runs);
    else
        printf("Scored a century\n");
    return 0;
}
```

Q6.

- a. Name the functions used for File Character I/O, String I/O, Formatted I/O and Record I/O? (3)
- b. Briefly explain text and binary stream? (3)
- c. Differentiate between object oriented programming paradigm and structured programming paradigm? (3)
- d. What are limitations when structures are created without tag name? (2)
- e. Differentiate between function parameters and arguments? (2)
- f. Provide the output of following program: (2)

```
#include<stdio.h>
int main(void)
{
    int d1,m1,y1;
    char date[11]="19/05/1973";
    date[2]=date[5]='\0';
    sscanf(date,"%d",&d1);
    sscanf(date+3,"%d",&m1);
    sscanf(date+6,"%d",&y1);
    date[2]=date[5]='/';
    printf("d1=%d,m1=%d,y1=%d\n",d1,m1,y1);
    printf("date=%s\n",date);
    return 0;
}
```