Branch : CSE & IT Batch : Hinglish

C Programming

Functions & Storage Classes

DPP-03

[NAT]

1. Consider the following function:

```
int f(int n)
{
   if(n<2) return n;
   return f(n/3)+3;
}
```

The value returned by f(27) is _____

[MCQ]

2. Consider the following program:

```
#include<stdio.h>
static int i;
extern int i=3;
void f(int n)
{
   if(n)
   {
      printf("%d\t", i++);
      f(n-1);
   }
}
int main()
{
    f(4);
    return 0;
}
```

The output is:

(a) 3 4 5 6 7

(b) 3 4 5 6

(c) 0 1 2 3

(d) Compilation error.

[NAT]

3. Consider the following function:

```
void f(int n){
static int i=3;
   if(n%2){
 n+=i--;
 printf("%d\t", n);
 f(n-1);
 }
   n++;
 printf("%d\t", n);
}
```

The sum of the values printed when f(5) is called is _____

[NAT]

4. Consider the following function:

```
int func(int a, int b)
{
    if (a<b)
    return a+b;
    else
    return 1+func(a-1, b+1);
}
```

The value returned by func(4, 2) is _____.

[MCQ]

5. Consider the following function:

```
void arc(int n){
  if (n<=2) return;
  else{
     arc(n-2);
     printf("%d\t", n-1);
     arc(n-3);
     printf("%d\t", n-2);
     }
   }
```

The output printed when arc(7) is called-

(a) 6 2 1 4 3 3 2 5

(b) 2 3 4 1 2 3 6 5

(c) 2 1 4 3 6 3 2 5

(d) 5 2 3 6 3 4 2 1

[MCQ]

6.
```
#include<stdio.h>
void print(int n)
{
printf("GATE Wallah\n");
   if(n++==0) return;
   print(n++);
}
int main()
{
    void print();
    void print();
    print(-4);
    return 0;
}
```

Which of the following is correct?

(a) Compilation error

(b) "GATE Wallah" will be printed infinite number of times.

(c) "GATE Wallah" will be printed 4 times.

(d) "GATE Wallah" will be printed 5 times.

[MCQ]

7. Consider the following program:

```
void arc()
{
int a;
static int b;
a=b;
printf("%d\t%d\t", a++, b++);
if(a<=3)
arc();
}
```

When arc() is called from main, the output is:

(a) 00112233

(b) 11223344

(c) 01122334

(d) 12233445

[NAT]

8. Consider the following function:

```
int arc(int i, int j)
{
   if(i<2) return j+2;
   else if(j<2) return arc(i-1, 1);
   else return arc(i-1, arc(i, j-2));
}
```

The value returned by arc(2, 6) is _____

Answer Key

1. **(10)**
2. **(b)**
3. **(45)**
4. **(8)**
5. **(c)**
6. **(d)**
7. **(a)**
8. **(9)**

Hints and Solutions

1. (10)

f(27):

if(n<2) return n; //27<2->FALSE

return f(n/3)+3; //f(9) is called;

//f(27) returns (7+3) i.e 10

f(9):

if(n<2) return n; //9<2->FALSE

return f(n/3)+3; //f(3) is called;

//f(9) returns (4+3) i.e 7 to f(27)

f(3):

if(n<2) return n; //3<2->FALSE

return f(n/3)+3; //f(1) is called; f(1) returns 1.

//f(3) returns (1+3) i.e 4 to f(9)

2. (b)

extern int i=3; //No compilation error. Assigns 3 to global static variable i.

f(4):

```
 if(4){//true
  printf("%d\t", i++);//3 is printed. Global static i is
  incremented to 4.
  f(n-1);//f(3) is called
}
```

f(3):

```
 if(3){//true
  printf("%d\t", i++);//4 is printed. Global static i is
  incremented to 5.
  f(n-1);//f(2) is called
}
```

f(2):

```
  if(2){//true
  printf("%d\t", i++);//5 is printed. Global static i is
  incremented to 6.
  f(n-1);//f(1) is called
}
```

f(1):

```
 if(1){//true
 printf("%d\t", i++);//6 is printed. Global static i is
 incremented to 7.
 f(n-1);//f(0) is called. It does nothing.
}
```

Output: 3 4 5 6

3. (45)

4. (8)

func(4, 2):

4<2 -> FALSE

return 1+func(3, 3);// return (1+7) i.e return 8

func(3, 3):

3<3 -> FALSE

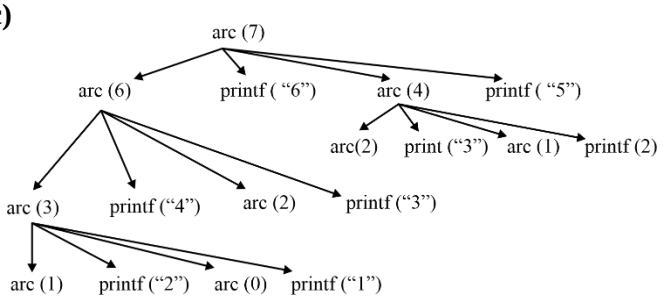
return 1+func(2, 4);// return (1+6) i.e return 7

func(2, 4):

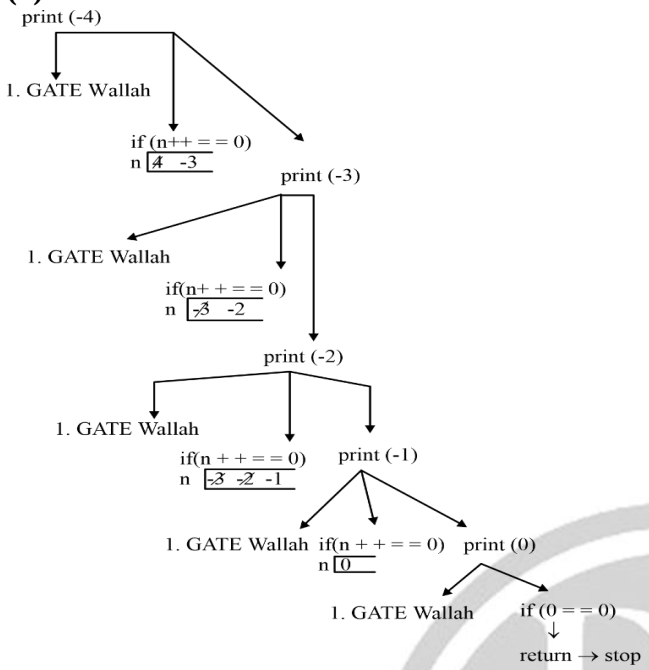
2<4 -> TRUE

return (2+4); // return 6

5. (c)



6. (d)



"GATE Wallah" is printed 5 times.

7. (a)

```
arc():
   int a;
   static int b; // static variable b is by default initialized
   to 0
   a=b;// a contains 0
   printf("%d\t%d\t", a++, b++);// 0 0 is printed. a is
   incremented to 1, b  is incremented to 1.
   if(a<=3) //1<=3-> True
   arc(); // arc() is called.
arc();
   int a;
   static int b; // static variable b contains 1.
   a=b;// a contains 1
   printf("%d\t%d\t", a++, b++);// 1 1 is printed. a is
   incremented to 2, b  is incremented to 2.
   if(a<=3) //2<=3-> True
   arc(); // arc() is called.
arc():
   int a;
   static int b; // static variable b contains 2.
   a=b;// a contains 2
   printf("%d\t%d\t", a++, b++);// 2 2 is printed. a
   incremented to 3, b is incremented to 3.
   if(a<=3) //3<=3-> True
   arc(); // arc() is called.
arc():
    int a;
    static int b; // static variable b contains 3.
    a=b;// a contains 3.
    printf("%d\t%d\t", a++, b++);// 3 3 is printed. a is
    incremented to 4, b is incremented to 4.
    if(a<=3) //4<=3-> False; execution stops.
```

8. (9)

arc(2, 6):

1: return arc(1, arc(2, 4));//arc(2, 4) returns 7

7: return arc(1, 7); //return (7+2) i.e 9

arc(2,4):

2: return arc(1, arc(2, 2));//arc(2, 2) returns 5 to arc(2, 4)

6: return arc(1, 4); //arc(1, 4) returns 7.

arc(2, 2):

3: return arc(1, arc(2, 0));

//arc(2, 0) returns 3 to arc(2, 2)

5: return arc(1, 2); //arc(1,2) returns 5

arc(2,0):

4: return arc(1, 1); //arc(1, 1) returns (1+2) i.e 3 to arc(2, 0)