# Branch : CSE & IT | Batch:Hinglish

# Programming in C

## Functions & Storage Classes

DPP-02

**[MCQ]**

**1.** Consider the following program:

```
#include <stdio.h>
int main(){
int a=2, i;
static int b=a++;
for(i=0;i<a+b;i++)
printf("GATE Wallah");
return 0;
}
```

Which of the following is/are CORRECT?

(a) GATE Wallah is printed 3 times.

(b) GATE Wallah is printed 4 times.

(c) GATE Wallah is printed 5 times.

(d) Compilation Error.

**[MCQ]**

**2.**

```
#include<stdio.h>
void main(){
    extern int a;
    extern int a;
    extern int a;
    printf("%d", a);
}
int a = 15;
```

The output is-

(a) Garbage value

(b) Compilation error

(c) 15

(d) No output

**[NAT]**

**3.**

```
#include<stdio.h>
int func(int a, int b){
    static int p=9, q=21;
    if(a>b){
        a=a-p++;
        b=b+q--;
        return a+b;
    }else{
        return p-q;
    }
}
int main(){
    int i=2, j=-2;
    for(;j<3;j++)
    printf("%d\t",func(i,j));
    return 0;
}
```

The sum of the values printed is _____.

**[MCQ]**

**4.** Consider the following program:

```
#include <stdio.h>
void f(){
    static int a=3;
    int b=5;
    a-=b++;
    printf("%d\t%d\n",a,b);
}
int main()
{
    static int a=2;
    int b=1;
    f();
    a+=3;
    f();
    printf("%d\t%d", a,b);
    return 0;
}
```

The output is-

(a)

–2 6
–7 6
5 1

(b)

–2 6
–7 7
5 1

(c)

–2 5
–7 6
5 1

(d) None

**[NAT]**

**5.**
```
#include <stdio.h>
int i=1;
int f(){
   static int i=2;
  return i++;
}
int main()
{
  extern int i;
  char a='B';
  printf("%d",a+f()+f()+i);
  return 0;
}
```
The output is _____

**[MCQ]**

**6.** Consider the following program:
```
#include <stdio.h>
static int j;
static int j=3;
int f(){
  auto int i=2;
  return i+++--j;
}
int main()
{
  char a='B';
  printf("%d",a+f()+f());
  return 0;
}
```
The output is-

(a) 68
(b) 72
(c) 73
(d) Compilation error

**[NAT]**

**7.** Consider the following program:
```
#include <stdio.h>
int f(){
  static int i=5;
  return i--;
}
int main()
{
  for(f();f();printf("GATE Wallah"))
  printf("Pankaj Sharma");
  return 0;
}
```
The number of times printf() is executed is _____.

**[MSQ]**

**8.** Which of the following statement(s) is/are CORRECT?

(a) A static variable has internal linkage.
(b) Static variables are stored in the data segment.
(c) Auto variables are stored in the heap segment.
(d) Register variables behave as auto variables by default.

# Answer Key

1. **(d)**
2. **(c)**
3. **(38)**
4. **(a)**
5. **(72)**
6. **(c)**
7. **(8)**
8. **(a, b, d)**

# Hints and Solutions

**1. (d)**

static int b=a++; //This is not allowed at the time of declaration of static variable. Assigned value must be a constant.

Hence, compilation error exists.

**2. (c)**

'extern int a' can be written multiple times.

extern shares the space of global variables.

∴ Output: 15

**3. (38)**

func(i, j) will be called 5 times for j values IN {-2, -1, 0, 1, 2}

| Data segment | |
|---|---|
| p: ~~9~~ ~~10~~ ~~11~~ ~~12~~ 13 | q: ~~21~~ ~~20~~ ~~19~~ ~~18~~ 17 |

func(2, -2):

a=2, b=-2

if(a>=b){ (2>-2)->TRUE

a=a-p++;// a=2-9=-7;p is then incremented to 10

b=b+q--;//b=-2+21=19;q is then decremented to 20

return a+b; //return (-7+19) i.e 12; So, 12 will be printed

}else return p-q;

Similarly, func(2, -1) returns 11; func(2, 0) returns 10; func(2, 1) returns 9;

func(2, 3) returns p-q i.e 13-17 i.e -4

Output: 12 11 10 9 -4

Sum: 38

**4. (a)**

f():

static int a=3;

int b=5;

a-=b++; //a=3-5=-2; b is incremented to 6.

printf("%d\t%d\n",a,b); //2 6 is printed.

f():

static int a=3; // a contains -2.

int b=5;

a-=b++; //a=-2-5=-7; b is incremented to 6.

printf("%d\t%d\n",a,b); //-7 6 is printed.

main():

static int a=2;

int b=1;

a+=3; //a=5

printf("%d\t%d\n",a,b); //5 1 is printed.

Output:

–2 6

–7 6

5 1

**5. (72)**

f():

static int i=2;

return i++; // return 2; i is incremented to 3.

f():

static int i=2; //i contains 3.

return i++; // return 3; i is incremented to 4.

main():

extern int i; //extern variable shares the space of global variables.

char a='B';

printf("%d",a+f()+f()+i);//(66+2+3+1) i.e. 72 is printed.

return 0;

**6. (c)**

static int j;

static int j=3;

Multiple declarations of global static variables are allowed. Hence, no compilation error.

f():

auto int i=2; // i is an auto or local variable.

return i+++--j; // return 2+2 i.e. 4. Auto i is incremented to 3, static j contains 2.

f():

auto int i=2; // i is an auto or local variable. It will be re-initialized to 2

return i+++--j; // return 2+1 i.e. 3. Auto i is incremented to 3, static j contains 1.

main():

char a='B';

printf("%d",a+f()+f()); // (66+4+3) i.e 73 is printed.

Output: 73

**7. (8)**

Initialization:f() returns 5; Static i is decremented to 4.

Condition: f() returns 4-> TRUE. Static i is decremented to 3.

Body: “Pankaj Sharma” is printed.

"GATE Wallah" is printed.

Condition: f() returns 3-> TRUE. Static i is decremented to 2.

Body: “Pankaj Sharma” is printed.

"GATE Wallah" is printed.

Condition: f() returns 2-> TRUE. Static i is decremented to 1.

Body: “Pankaj Sharma” is printed.

"GATE Wallah" is printed.

Condition: f() returns 1-> TRUE. Static i is decremented to 0.

Body: “Pankaj Sharma” is printed.

"GATE Wallah" is printed.

Condition: f() returns 0-> FALSE. Execution stops.

Hence, printf() is executed 8 times.

**8. (a, b, d)**

(a) CORRECT. A static variable has internal linkage.

(b) CORRECT. Static variables are stored in the data segment.

(c) INCORRECT. Auto variables are stored in the stack segment.

(d) CORRECT. Register variables behave as auto variables by default.