“ *Computers are good at following instructions, but not at reading your mind.* ” - Donald Knuth

1. What is the output of this program?

```
#include<stdio.h>
int main()
{
        char *ptr;
        char string[] = "How are you?";
        ptr = string;
        ptr += 4;
        printf("%s",ptr);
        return 0;
}
```

(a) How are you?
(b) are you?
(c) are
(d) No output

2. Which of the following will print the value 2 for the above code?

```
#include<stdio.h>
int main()
{
        int a[10][20][30] = {0};
        a[5][2][1] = 2;

        return 0;
}
```

(a) printf("%d",*(((a+5)+2)+1));
(b) printf("%d",***((a+5)+2)+1);
(c) printf("%d",*(*(*(a+5)+2)+1));
(d) None of these

3. What is the output of the following program?

```
#include<stdio.h>
int main()
{
        int a = 5;
        int b = ++a * a++;
        printf("%d ",b);
        return 0;
}
```

(a) 25
(b) 30
(c) 36
(d) Undefined Behavior

4. What is the output of the following program?

```
#include<stdio.h>
int main()
{
        int a = 5;
        switch(a)
        {
                default:
                        a = 4;
                case 6:
                        a--;
                case 5:
                        a = a+1;
                case 1:
                        a = a-1;
        }
         printf("%d \n",a);
        return 0;
}
```

(a) 5
(b) 4
(c) 3
(d) None of these

5. What is the output of the following program?

```
#include<stdio.h>
int main()
{
        int a = 2,b = 5;
        a = a^b;
        b = b^a;
        printf("%d %d",a,b);
        return 0;
}
```

(a) 5 2
(b) 2 5
(c) 7 7
(d) 7 2

6. What is the output of the following program?

```
#include <stdio.h>
int main()
{
```

```
        int a[][3] = {1, 2, 3, 4, 5, 6};
        int (*ptr)[3] = a;
        printf("%d %d ", (*ptr)[1], (*ptr)[2]);
        ++ptr;
        printf("%d %d\n", (*ptr)[1], (*ptr)[2]);
        return 0;
}
```

(a) 2 3 5 6
(b) 2 3 4 5
(c) 4 5 0 0
(d) none of the above

7. What is the output of the following program?

```
#include <stdio.h>
void f(char**);

int main()
{
        char *argv[] = { "ab", "cd", "ef", "gh", "ij", "kl" };
        f(argv);
        return 0;
}
void f(char **p)
{
        char *t;
        t = (p += sizeof(int))[-1];
        printf("%s\n", t);
}
```

(a) ab
(b) cd
(c) ef
(d) gh

8. What is the output of the following program?

```
#include <stdarg.h>
#include <stdio.h>

int ripple(int n, ...)
{
        int i, j, k;
        va_list p;
        k = 0;
        j = 1;
        va_start(p, n);
        for (; j < n; ++j)
```

```
        {
                i = va_arg(p, int);
                k += i;
        }
        va_end(p);
        return k;
}
int main()
{
        printf("%d\n", ripple(3, 5, 7));
        return 0;
}
```

(a) 12
(b) 5
(c) 7
(d) 15

9. What is the output of the following program?

```
#include <stdio.h>
int counter(int i)
{
        static int count = 0;
        count = count + i;
        return count;
}

int main()
{
        int i, j;
        for (i = 0; i <= 5; i++)
                j = counter(i);
        printf("%d\n", j);
        return 0;
}
```

(a) 10
(b) 15
(c) 6
(d) 7

10. What is the output of the following program?

```
#include<stdio.h>
int main()
{
        const int x=5;
        const int *ptrx;
```

```
        ptrx = &x;
        *ptrx = 10;
        printf("%d\n", x);
        return 0;
}
```

(a) 5
(b) 10
(c) Compile Error
(d) Garbage value

11. What is the output of the following program?

```
#include<stdio.h>
#define x 4+1
int main()
{
        int i;
        i = x*x*x;
        printf("%d",i);
        return 0;
}
```

(a) 125
(b) 13
(c) 17
(d) None of above

12. What is the output of the following program?

```
#include<stdio.h>
int main()
{
        char c=125;
        c=c+10;
        printf("%d",c);
        return 0;
}
```

(a) 135
(b) +INF
(c) -121
(c) -8

13. What is the output of the following program?

```
#include<stdio.h>
int main()
{
        int i=10;
        static int x=i;
```

```
        if(x==i)
                printf("Equal");
        else if(x>i)
                printf("Greater");
        else
                printf("Lesser");
        return 0;
}
```

(a) Equal
(b) Greater
(c) Lesser
(d) Compile Error

14. Consider the following code segment:

```
#include <stdlib.h>

int *f1()
{
        int x = 10;
        return &x;
}
int *f2()
{
        int *ptr;
        *ptr = 10;
        return ptr;
}
int *f3()
{
        int *ptr;
        ptr = (int*) malloc(sizeof (*ptr));
        return ptr;
}
```

Which of these functions uses pointers incorrectly?

(a) f3 only
(b) f1 and f3
(c) f1 and f2
(d) f1, f2, and f3

15. What is the output of the following program?

```
#include <stdio.h>
int main()
{
        int i = 3;
        int j;
```

```
        j = sizeof(++i + ++i);
        printf("i=%d j=%d\n", i, j);
        return 0;
}
```

(a) i=4 j=4
(b) i=3 j=4
(c) i=5 j=4
(d) the behavior is undefined

16. What is the output of the following program?

```
#include <stdio.h>
void f1(int*, int);
void f2(int*, int);
void (*p[2])(int*, int);

int main()
{
        int a = 3;
        int b = 5;
        p[0] = f1;
        p[1] = f2;
        p[0](&a, b);
        printf("%d %d ", a, b);
        p[1](&a, b);
        printf("%d %d\n", a, b);
        return 0;
}

void f1(int *p, int q)
{
        int tmp = *p;
        *p = q;
        q = tmp;
}
void f2(int *p, int q)
{
        int tmp = *p;
        *p = q;
        q = tmp;
}
```

(a) 5 5 5 5
(b) 3 5 3 5
(c) 5 3 3 5
(d) none of the above

17. What is the output of the following program?

```
#include <stdio.h>
void e(int);

int main()
{
        int a = 3;
        e(a);
        putchar('\n');
        return 0;}
void e(int n)
{
        if (n > 0)
        {
                e(--n);
                printf("%d ", n);
                e(--n);
        }
}
```

(a) 0 1 2 0
(b) 0 1 2 1
(c) 1 2 0 1
(d) 0 2 1 1

18. Consider the following code segment:

```
typedef int (*test)(float*, float*);
test tmp;
```

What is the type of tmp?

(a) function taking two pointer-to-float arguments and returning pointer to int
(b) pointer to int
(c) pointer to function taking two pointer-to-float arguments and returning int
(d) none of the above

19. What is the output of the following program?

```
#include <stdio.h>

int main()
{
        char p;
        char buf[10] = {1, 2, 3, 4, 5, 6, 9, 8};
        p = (buf + 1)[5];
        printf("%d\n", p);
        return 0;
}
```

(a) 5
(b) 6
(c) 9
(d) none of the above

20. What is the output of the following program?

```
#include <stdio.h>
int main()
{
        struct node
        {
                int a;
                int b;
                int c;
        };
        struct node s = { 3, 5, 6 };
        struct node *pt = &s;
        printf("%d\n", *((int*)pt+1));
        return 0;
}
```

(a) 3
(b) 5
(c) 6
(d) 7

21. What is the output of the following program?

```
#include <stdio.h>
int main(void)
{
        char a[5] = { 1, 2, 3, 4, 5 };
        char *ptr = (char*)(&a + 1);
        printf("%d %d\n", *(a + 1), *(ptr - 1));
        return 0;
}
```

(a) Compile Error
(b) 2 1
(c) 2 5
(d) none of the above

22. What is the output of the following program?

```
#include <stdio.h>
void foo(int[][3]);

int main(void)
{
        int a[3][3] = { {1, 2, 3}, {4, 5, 6}, {7, 8, 9} };
        foo(a);
```

```
	printf("%d\n", a[2][1]);
	return 0;
}

void foo(int b[][3])
{
	++b;
	b[1][1] = 9;
}
```

(a) 8
(b) 9
(c) 7
(d) none of the above

23. Consider the following function:

```
int foo(int x, int n)
{
	int val = 1;
	if (n > 0)
	{
		if (n % 2 == 1)
		val *= x;
		val *= foo(x * x, n / 2);
	}
	return val;
}
```

What function of x and n is computed by foo?
(a) x^n
(b) x×n
(c) nx
(d) none of the above

24. What is the output of the following program?

```
#include<stdio.h>

int main()
{
	int a = 0;
	switch(a)
	{
		default:
			a = 4;
		case 6:
			a--;
		case 5:
			a = a+1;
		case 1:
```

```
                        a = a-1;
        }
         printf("%d \n",a);
        return 0;
}
```

(a) 5
(b) 4
(c) 3
(d) 0

25. What is the output of the following program?

```
#include<stdio.h>
int main()
{
        int a = 2;
        if(a == (1,2))
                printf("Hello");
        if(a == 1,2)
                printf("World");
        return 0;
}
```

(a) Hello
(b) World
(c) Hello World
(d) Compile Error

26. What is the output of the following program?

```
#include<stdio.h>
int main()
{
        int a = 1,2;
        int b = (1,2);
        if(a == b)
                printf("Equal");
        else
                printf("Not Equal");
        return 0;
}
```

(a) Equal
(b) Not Equal
(c) Compiler Dependent
(d) Compile Error

27. What is the output of the following program?

```
#include<stdio.h>
void foo(char *);
```

```
int main()
{
	char *string = "Hello";
	foo(string);
	printf("%s",string);
	return 0;
}

void foo(char *a)
{
	while(*a)
	{
		*a += 1;
		a++;
	}
}
```

(a) Hello
(b) Ifmmp
(c) Compile Error
(d) Segmentation fault

28. What is the output of the following program?

```
#include<stdio.h>
#include<stdlib.h>
int main()
{
	char s[] = "Opendays2012";
	int i = 0;
	while(*(s++))
		i++;
	printf("%d",i);
	return 0;
}
```

(a) Segmentation Fault
(b) Compile Error
(c) 12
(d) 0

29. What is the output of the following program?

```
#include<stdio.h>
int a = 10;
int main()
{
	fun();
	fun();
	return 0;
}
```

```
int fun()
{
        static int a = 1;
        printf("%d ",a);
        a++;
        return 0;
}
```
(a) 1 2
(b) 1 1
(c) 10 11
(d) 10 10

30. What is the output of the following program?

```
#include <stdio.h>
#define crypt(s,t,u,m,p,e,d) m##s##u##t
#define begin crypt(a,n,i,m,a,t,e)
int begin()
{
        printf("Hello\n");
        return 0;
}
```
(a) Hello
(b) Link error
(c) Segmentation fault
(d) Compiler error

31. Consider the following program:

```
#include<stdio.h>
int main()
{
        int a[10][20][30]={0};
        printf("%ld",&a+1 - &a);
        return 0;
}
```
What is the output of this program?
Ans:

32. Consider the following program:

```
#include<stdio.h>
int main()
{
        int a[10][20][30] = {0};
        int *b = a;
        int *c = a+1;
```

```
        printf("%ld", c-b);
        return 0;
}
```

What is the output of this program?
(You may ignore compiler warnings)

Ans:

33. Consider the following program:

```
#include<stdio.h>
#include<stdlib.h>
int* fun();

int main()
{
        int *a = fun();
        printf("%d",*a);
        return 0;
}
int* fun()
{
        int *a =(int*) malloc(sizeof(int));
        *a = 10;
        return a;
}
```

What is the output of this program?
Ans:

34. Consider the following program:

```
#include<stdio.h>
int main()
{
        int *a = fun();
        printf("%d",*a);
        return 0;
}
int fun()
{
        int a = 10;
        return a;
}
```

What is the output of this program?
Ans:

35. Consider the following program:

```
#include<stdio.h>
#include<string.h>

int main()
{
	char string[] = "Hello";
	printf("%lu %lu",sizeof(string),strlen(string));
	return 0;
}
```

What is the output of this program?
Ans:

36. Consider the following program:

```
#include<stdio.h>
int main()
{
	float a = 0.5;
	if(a == 0.5)
		printf("Yes");
	else
		printf("No");
	return 0;
}
```

What is the output of this program?
Ans:

37. Consider the following program:

```
#include<stdio.h>
#include<string.h>
void foo(char *);

int main()
{
	char a[100] = {0};
	printf("%lu %lu",sizeof(a),strlen(a));
	return 0;
}
```

What is the output of this program?
Ans:

38. Consider the following program:

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

What is the output of the above code?

Ans:

39. If the binary equivalent of 5.375 in normalised form is 0100 0000 1010 1100 0000 0000 0000 0000, what will be the output of the program ?

```
#include<stdio.h>
#include<math.h>

int main()
{
        float a=5.375;
        char *p;
        int i;
        p = (char*)&a;
        for(i=0; i<2; i++)
                printf("%02x ", (unsigned char)(p[i]^p[3-i]));
        return 0;
}
```

Ans:

40. Consider the following program:

```
#include<stdio.h>
int main()
{
        char str[] = {'a','b','c','\0'};
        str[0] -= 32;
        printf("%s",str);
        return 0;
}
```

What is the output of the above code?

Ans:

41. What is the following function doing?

```
int foo(int n)
{
	int sum = 0;
	while(n > 0)
	{
		n = n & n-1;
		sum++;
	}
	return sum;
}
```

Ans:

42. What is the following function doing?

```
int foo(int a, int b)
{
	int c = a, d = b;
	while(a != b)
	{
		if(a < b)
			a = a+c;
		else
			b = b+d;
	}
	return a;
}
```

Ans:

43. What is the following function doing?

```
int foo( int a, int b)
{
	int c = a-b;
	c = c&(0x80000000);
	return (!c)*a +(!!c)*b;
}
```

Ans:

44. What is the following function doing?

```
unsigned fun(unsigned a, unsigned b)
{
        int i;
        unsigned  j = 0;
        for(i = 0; i < 32; i++)
        {
                j <<= 1;
                j += !!(a & 0x80000000);
                a <<= 1;
                if(j >=b)
                {
                        j -= b;
                        a++;
                }

        }
        return a;
}
```

Ans:

45. What is the following function doing?

```
unsigned fun(unsigned int a)
{
        unsigned int i, x = 0, y = 0, z = 0;
        for(i = 0; i < 16; i++)
        {
                y <<= 2;
                y += !!(a & 0x80000000) << 1;
                y += !!(a & 0x40000000);
                a <<= 2;
                x = x + (x&1);
                x <<= 1;
                z <<= 1;
                if(x + 1 <= y)
                {
                        x++;
                        z++;
                        y-=x;
                }
        }
        return z;
}
```

Ans:

46. Write the code to dynamically allocate a 2-D array of size m x n.

Ans:

47. Declare a pointer to a function accepting an integer and returning void.

Ans:

48. Write the *condition* so that the below code outputs “Hello World”.

```
#include<stdio.h>
int main()
{
        if(<condition>)
        {
                printf("Hello ");
        }
        else
        {
                printf("World\n");
        }
        return 0;
}
```

Ans:

49. Write a one line code to check if a number is a power of 2.

Ans:

50. Write a one line code to invert the last four bits of an integer.

Ans: