

C Programming GATE Questions with Answers

1. The number of tokens in the following C statement is?

```
printf("i = %d, &i = %x", i, &i);
```

(a) 3 (b) 26 (c) 10 (d) 21

Answer: (c)

2. What will be the output of the following C program segment?

```
char inchar = 'A';
switch (inchar)
{
case 'A' :
printf ("choice A \n") ;
case 'B' :
printf ("choice B ") ;
case 'C' :
case 'D' :
case 'E' :
default:
printf ("No Choice") ;
}
```

(a) No choice

(b) Choice A

(c) Choice A Choice B No choice

(d) Program gives no output as it is erroneous

Answer: ©

3. Consider the following C function definition:

```
int Trial (int a, int b, int c)
{
if ((a >= b) && (c < b)) return b;
else if (a >= b) return Trial (a,c,b);
else return Trial (b,a,c);
}
```

The function Trial:

(a) Finds the maximum of a, b, and c

(b) Finds the minimum of a, b and c

(c) Finds the middle number of a, b, c

(d) None of the above

Answer: (c)

4. The value of j at the end of the execution of the following C program.

```

int incr (int i)
{
static int count = 0;
count = count + i;
return (count);
}
main ()
{
int i,j;
for (i = 0; i <=4; i++)
j = incr(i);
}
(a) 10 (b) 4 (c)6 (d) 7
Answer: (a)

```

5. Consider the following declaration of a 'two-dimensional array in C:
char a[100][100];
Assuming that the main memory is byte-addressable and that the array is stored starting from memory address 0, the address of a[40][50] is
(a) 4040 (b) 4050 (c) 5040 (d) 5050
Answer: (b)

6. Consider the following C-program:

```

void foo(int n, int sum)
{
int k = 0, j = 0;
if (n == 0) return;
k = n % 10; j = n / 10;
sum = sum + k;
foo (j, sum);
printf ("%d,", k);
}
int main ()
{
int a = 2048, sum = 0;
foo (a, sum);
printf ("%d\n", sum);
getchar();
}

```

What does the above program print?

- (a) 8, 4, 0, 2, 14
- (b) 8, 4, 0, 2, 0
- (c) 2, 0, 4, 8, 14
- (d) 2, 0, 4, 8, 0

Answer: (d)

7. Consider the following C function:

```
int f(int n)
{
static int i = 1;
if (n >= 5)
return n;
n = n+i;
i++;
return f(n);
}
```

The value returned by f(1) is

(a) 5 (b) 6 (c) 7 (d) 8

Answer: (c)

8. Consider the following C program

```
void main()
{
int x, y, m, n;
scanf ("%d %d", &x, &y);
/* x > 0 and y > 0 */
m = x; n = y;
while (m != n)
{
if(m>n)
m = m - n;
else
n = n - m;
}
printf("%d", n);
}
```

The program computes

- (a) $x + y$ using repeated subtraction
- (b) $x \bmod y$ using repeated subtraction
- (c) the greatest common divisor of x & y
- (d) the least common multiple of x & y

Answer: (c)

9. Consider the following C-program:

```
double foo (double); /* Line 1 */
int main () {
double da, db;
// input da
```

```
db = foo (da);
}
double foo (double a) {
return a;
}
```

The above code compiled without any error or warning. If Line 1 is deleted, the above code will show:

- (a) no compile warning or error
- (b) some compiler-warnings not leading to unintended results
- (c) some compiler-warnings due to type-mismatch eventually leading to unintended results
- (d) compiler errors

Answer: (d)

10. Consider line number 3 of the following C-program.

```
int main ( ) { /* Line 1 */
int i, n; /* Line 2 */
fro (i =0, i<n, i++); /* Line 3 */
}
```

Identify the compiler's response about this line while creating the object-module:

- (a) No compilation error
- (b) Only a lexical error
- (c) Only syntactic errors
- (d) Both lexical and syntactic errors

Answer: (c)

11. Consider these two functions and two statements S1 and S2 about them.

```
int work1(int *a, int i, int j)
{
int x = a[i+2];
a[j] = x+1;
return a[i+2] - 3;
}
int work2(int *a, int i, int j)
{
int t1 = i+2;
int t2 = a[t1];
a[j] = t2+1;
return t2-3;
}
```

S1: The transformation from work1 to work2 is valid, i.e., for any program state and input arguments, work2 will compute the same output and have the same effect on program state as work1

S2: All the transformations applied to work1 to get work2 will always improve the performance (i.e reduce CPU time) of work2 compared to work1

- (a) S1 is false and S2 is false
- (b) S1 is false and S2 is true
- (c) S1 is true and S2 is false
- (d) S1 is true and S2 is true

Answer: (d)

12. Consider the following C function:

```
int f(int n)
{
static int r = 0;
if (n <= 0) return 1;
if (n > 3)
{
r = n;
return f(n-2)+2;
}
return f(n-1)+r;
}
```

What is the value of f(5) ?

- (a) 5 (b) 7 (c) 9 (d) 18

Answer: (d)

Consider the following recursive C function that takes two arguments

```
unsigned int foo(unsigned int n, unsigned int r) {
if (n > 0) return (n%r + foo (n/r, r ));
else return 0;
}
```

13. What is the return value of the function foo when it is called as foo(345, 10) ?

- (a) 345 (b) 12 (c) 5 (d) 3

Answer: (b)

14. What is the return value of the function foo when it is called as foo(513, 2)?

- (a) 9 (b) 8 (c) 5 (d) 2

Answer: (d)

15. Choose the correct to fill ?1 and ?2 so that the program below prints an input string in reverse order. Assume that the input string is terminated by a newline character.

```
void reverse(void)
{
int c;
if (?_1) reverse() ;
?_2
}
main()
```

```
{  
printf ("Enter Text ") ; printf ("\n") ;  
reverse(); printf ("\n") ;  
}
```

- (a) ?1 is (getchar() != '\n') and ?2 is getchar(c);
 - (b) ?1 is (c = getchar()) != '\n') and ?2 is getchar(c);
 - (c) ?1 is (c != '\n') and ?2 is putchar(c);
 - (d) ?1 is ((c = getchar()) != '\n') and ?2 is putchar(c);
- Answer: (d)

16. The following C declaration

```
struct node  
{  
int i;  
float j;  
};  
struct node *s[10] ;  
define s to be
```

- (a) An array, each element of which is a pointer to a structure of type node
- (b) A structure of 2 fields, each field being a pointer to an array of 10 elements
- (c) A structure of 3 fields: an integer, a float, and an array of 10 elements
- (d) An array, each element of which is a structure of type node.

Answer: (a)

17. The most appropriate matching for the following pairs

X: m=malloc(5); m= NULL; 1: using dangling pointers

Y: free(n); n->value=5; 2: using uninitialized pointers

Z: char *p; *p = 'a'; 3: lost memory

is:

- (a) X — 1 Y — 3 Z-2
- (b) X — 2 Y — 1 Z-3
- (c) X — 3 Y — 2 Z-1
- (d) X — 3 Y — 1 Z-2

Answer: (d)

18. Consider the following C declaration

```
struct {  
short s [5]  
union {  
float y;  
long z;  
}u;  
} t;
```

Assume that objects of the type short, float and long occupy 2 bytes, 4 bytes and 8 bytes, respectively. The memory requirement for variable t, ignoring alignment considerations, is (a) 22 bytes (b) 14 bytes (c) 18 bytes (d) 10 bytes

Answer: (c)

19. Assume the following C variable declaration

```
int *A [10], B[10][10];
```

Of the following expressions

I. A[2]

II. A[2][3]

III. B[1]

IV. B[2][3]

which will not give compile-time errors if used as left hand sides of assignment statements in a C program?

(a) I, II, and IV only

(b) II, III, and IV only

(c) II and IV only

(d) IV only

Answer: (a)

20. Consider the following C function

```
void swap (int a, int b)
```

```
{  
int temp;  
temp = a;  
a = b;  
b = temp;  
}
```

In order to exchange the values of two variables x and y.

a) call swap (x, y)

b) call swap (&x, &y)

c) swap (x, y) cannot be used as it does not return any value

d) swap (x, y) cannot be used as the parameters are passed by value

Answer: (d)

21. What does the following C-statement declare?

```
int (*f) (int *);
```

(a) A function that takes an integer pointer as argument and returns an integer

(b) A function that takes an integer as argument and returns an integer pointer

(c) A pointer to a function that takes an integer pointer as argument and returns an integer.

(d) A function that takes an integer pointer as argument and returns a function pointer

Answer: (c)

22. What does the following program print?

```
#include<stdio.h>
void f(int *p, int *q)
{
p = q;
*p = 2;
}
int i = 0, j = 1;
int main()
{
f(&i, &j);
printf("%d %d \n", i, j);
getchar();
return 0;
}
(a) 2 2 (b) 2 1 (c) 0 1 (d) 0 2
Answer: (d)
```

23. What does the following fragment of C-program print?

```
char c[] = "GATE2011";
char *p =c;
printf("%s", p + p[3] - p[1]);
(a) GATE2011 (b) E2011 (c) 2011 (d) 011
Answer: (c)
```

24. Consider the following C program segment:

```
char p[20];
char *s = "string";
int length = strlen(s);
int i;
for (i = 0; i < length; i++)
p[i] = s[length - i];
printf("%s",p);
The output of the program is
(a) gnirts
(b) gnirt
(c) string
(d) no output is printed
Answer: (d)
```

Consider the following C program

```
int a, b, c = 0;
void prtFun (void);
int main ()
{
```

```

static int a = 1; /* line 1 */
prtFun();
a += 1;
prtFun();
printf ( "\n %d %d " , a, b);
}
void prtFun (void)
{
static int a = 2; /* line 2 */
int b = 1;
a += ++b;
printf (" \n %d %d " , a, b);
}

```

25. What output will be generated by the given code segment?

- (a) || (b) || © || (d)
3 1 || 4 2 || 4 2 || 3 1
4 1 || 6 1 || 6 2 || 5 2
4 2 || 6 1 || 2 0 || 5 2

Answer: (c)

26. What output will be generated by the given code segment if:

Line 1 is replaced by "auto int a = 1;

Line 2 is replaced by "register int a = 2;

- (a) || (b) || (c) || (d)
3 1 || 4 2 || 4 2 || 4 2
4 1 || 6 1 || 6 2 || 4 2
4 2 || 6 1 || 2 0 || 2 0

Answer: (d)

27. What is printed by the following C program?

```

int f(int x, int *py, int **ppz)
{
int y, z;
**ppz += 1;
z = **ppz;
*py += 2;
y = *py;
x += 3;
return x + y + z;
}
void main()
{
int c, *b, **a;
c = 4;

```

```
b = &c;
a = &b;
printf( "%d", f(c,b,a));
getchar();
}
```

(a) 18 (b) 19 (c) 21 (d) 22
Answer: (b)

28. The output of the following C program is _____.

```
#include <stdio.h>
void f1(int a, int b)
{
int c;
c=a; a=b; b=c;
}
void f2(int *a, int *b)
{
int c;
c=*a; *a=*b;*b=c;
}
int main()
{
int a=4, b=5, c=6;
f1 (a, b);
f2 (&b, &c);
printf("%d", c-a-b);
}
```

Answer: -5

29. What is the output of the following C code? Assume that the address of x is 2000 (in decimal) and an integer requires four bytes of memory.

```
int main()
{
unsigned int x[4][3] = {{1, 2, 3}, {4, 5, 6}, {7, 8, 9}, {10, 11, 12}};
printf("%u,%u, %u", x+3, *(x+3),*(x+2)+3);
}
```

- (a) 2036, 2036, 2036
- (b) 2012, 4, 2204
- (c) 2036, 10, 10
- (d) 2012, 4, 6

Answer: (a)

30. Consider the following C function.

```
int fun1 (int n)
```

```

{
int i, j, k, p, q = 0;
for (i = 1; i<n; ++i)
{
p = 0;
for (j=n; j>1; j=j/2)
++p;
for (k=1; k<p; k=k*2)
++q;
}
return q;
}

```

Which one of the following most closely approximates the return value of the function fun1?

- (a) n^3
- (b) $n(\log n)^2$
- (c) $n \log n$
- (d) $n \log(\log n)$

Answer: (d)

31. Consider the following C program segment.

```

#include <stdio.h>
int main( )
{
char s1[7] = "1234", *p;
p = s1 + 2;
*p = '0' ;
printf ("%s", s1);
}

```

What will be printed by the program?

- (a) 12
- (b) 120400
- (c) 1204
- (d) 1034

Answer: (c)

32. Consider the following C program.

```

#include<stdio.h>
int main( )
{
static int a[] = {10, 20, 30, 40, 50};
static int *p[] = {a, a+3, a+4, a+1, a+2};
int **ptr = p;
ptr++;
printf {"%d%d", ptr-p, **ptr};
}

```

```
}
```

The output of the program is _____.

Answer: 140

33. Consider the following recursive C function.

```
void get (int n)
{
if (n < 1) return;
get (n-1);
get (n-3);
printf ("%d", n);
}
```

If get(6) function is being called in main() then how many times will the get() function be invoked before returning to the main()?

(a) 15

(b) 25

(c) 35

(d) 45

Answer: (b)

34. Consider the following C program:

```
# include <stdio.h>
int main( )
{
int i, j, k = 0;
j = 2 * 3 / 4 + 2.0 / 5 + 8 / 5;
k -= - j;
for(i = 0; i < 5; i++)
{
switch(i + k)
{
case 1:
case 2: printf("\n%d", i + k);
case 3: printf("\n%d", i + k);
default: printf("\n%d", i + k);
}
}
return 0;
}
```

The number of times the printf statement is executed is _____.

Answer: 10

35. Consider the following C program.

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

```

int f1(void);
int f2(void);
int f3(void);
int x = 10;
int main( )
{
int x = 1;
x +=f1() + f2() + f3() + f2();
printf("%d", x);
return 0;
}
int f1() { int x = 25; x++; return x; }
int f2() { static int x = 50; x++; return x; }
int f3() { x *= 10; return x; }
The output of the program is _____.
Answer: 230

```

36. Consider the C program below.

```

#include<stdio.h>
int *A, stkTop;
int stkFunc (int opcode, int val)
{
static int size=0, stkTop=0;
switch (opcode)
{
case -1: size = val; break;
case 0: if (stkTop < size) A[stkTop++] = val; break;
default: if (stkTop) < return A[ - stkTop];
}
return -1;
}
int main()
{
int B[20]; A=B; stkTop = -1
stkFunc(-1, 10);
stkFunc(0, 5);
stkFunc(0, 10);
printf("%d\n", stkFunc (1, 0) + stkFunc (0, 0));
}
The output of the program is _____.
Answer: 15

```

37. Consider the following C function.

```

int fun(int n)

```

```
{
int x=1, k;
if (n==1) return x;
for (k=1; k<n; ++k)
x = x + fun (k) * fun (n - k);
return x;
}
```

The return value of fun (5) is ___.

Answer: 51

38. Consider the following function written in the C programming language.

```
void foo (char *a)
{
if (*a && *a != ` `)
{
foo (a+1);
putchar (*a);
}
}
```

The output of the above function on input "ABCD EFGH" is

- (a) ABCD EFGH
- (b) ABCD
- (c) HGFE DCBA
- (d) DCBA

Answer: (d)