C MCQ Questions

C Basics

1. Which of the following is the correct syntax for declaring a variable in C?

   a) `int x = 5;` b) `integer x = 5;` c) `var x = 5;` d) `x : int = 5;`

2. What is the output of the following code?

```
#include <stdio.h>
int main() {
    printf("%d", 5 + 3 * 2);
    return 0;
}
```

   a) 16 b) 11 c) 13 d) 10

3. Which header file is essential to use `printf` and `scanf`?

   a) `stdlib.h` b) `string.h` c) `stdio.h` d) `math.h`

4. What does the following code print?

```
#include <stdio.h>
int main() {
    char ch = 'A';
    printf("%c", ch + 3);
    return 0;
}
```

   a) `A` b) `D` c) `C` d) `B`

5. In C, the keyword `return` is used to:

   a) Exit a program b) Return a value from a function c) Both a and b d) None of the above

Functions

6. Which of the following is the correct syntax for a function declaration? a) `void myFunction(int x);` b) `function myFunction(x : int);` c) `func myFunction(int x);` d) `int myFunction();`

7. What will the following code output?

```
#include <stdio.h>
void greet() {
    printf("Hello, World!\n");
}
int main() {
    greet();
    return 0;
}
```

   a) No output b) `Hello, World!` c) Compiler Error d) Runtime Error

8. How many times is the `factorial` function called in the code below if `n = 4`?

```
int factorial(int n) {
    if (n == 0) return 1;
    return n * factorial(n - 1);
}
```

   a) 4 b) 5 c) 6 d) 0

9. What is the return type of the function `main()` in C?

   a) `void` b) `int` c) `float` d) `char`

10. Which of the following is true about function arguments in C?

    a) They must always be pointers. b) They can be of any type. c) Only integer arguments are allowed. d) Functions cannot take arguments.

Arrays

11. What is the index of the first element in an array in C? a) 1 b) 0 c) -1 d) Undefined

12. Predict the output of the following code:

```
#include <stdio.h>
int main() {
    int arr[3] = {1, 2, 3};
    printf("%d", arr[1]);
    return 0;
}
```

    a) 1 b) 2 c) 3 d) 0

13. Which of the following is the correct syntax to declare a 2D array in C?

    a) `int arr[3][3];` b) `array<int> arr[3][3];` c) `int arr(3, 3);` d) `int arr{3, 3};`

14. What happens if you access an array index out of bounds in C?

    a) It raises a compilation error. b) It causes undefined behavior. c) It automatically resizes the array. d) It raises an exception.

15. Which function is used to calculate the size of an array in C?

    a) `sizeof` b) `length` c) `size` d) `dimension`

Pointers and DMA

16. Which operator is used to get the address of a variable in C?

    a) `*` b) `&` c) `#` d) `@`

17. What will the following code output?

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

a) Address of `x` b) `5` c) Error d) Garbage value

18. Which library function is used for dynamic memory allocation?

a) `malloc` b) `memalloc` c) `alloc` d) `dynalloc`

19. What is the output of the following code?

```
#include <stdio.h>
#include <stdlib.h>
int main() {
    int *ptr = malloc(sizeof(int));
    *ptr = 10;
    printf("%d", *ptr);
    free(ptr);
    return 0;
}
```

a) 0 b) `10` c) Compilation Error d) Undefined

20. What is the correct way to free dynamically allocated memory in C?

a) `free(ptr);` b) `delete(ptr);` c) `release(ptr);` d) `free_memory(ptr);`

Structures

21. What is the correct syntax to declare a structure in C?

a) `struct { int a; float b; } myStruct;`

b) `structure myStruct { int a; float b; };`

c) `struct myStruct { int a; float b; };`

d) `struct myStruct: int a; float b;`

22. Predict the output of the following code:

```
#include <stdio.h>
struct Point {
    int x;
    int y;
};
int main() {
    struct Point p = {3, 4};
    printf("%d, %d", p.x, p.y);
    return 0;
}
```

a) 3, 4 b) 4, 3 c) 0, 0 d) Compilation Error

23. How do you access a structure member using a pointer?

a) `ptr->member` b) `*ptr.member` c) `ptr*member` d) `ptr:member`

24. What will the following code output?

```
#include <stdio.h>
struct Employee {
    int id;
    char name[20];
};
int main() {
    struct Employee e = {101, "John"};
    printf("%d, %s", e.id, e.name);
    return 0;
}
```

a) 101, John b) Compilation Error c) Garbage value d) 0, John

25. Which keyword is used to define a structure?

a) `struct` b) `class` c) `object` d) `record`

File Handling

26. Which function is used to open a file in C?

    a) `fileopen()` b) `open()` c) `fopen()` d) `file()`

27. What is the mode to open a file for reading?

    a) `"w"` b) `"r"` c) `"rw"` d) `"rb"`

28. Which of the following is true about `fclose()`?

    a) It closes an open file. b) It frees all memory associated with the file. c) It flushes the buffer before closing the file. d) All of the above

29. What will the following code output if the file `test.txt` contains `Hello`?

```
#include <stdio.h>
int main() {
    FILE *fp = fopen("test.txt", "r");
    char c = fgetc(fp);
    printf("%c", c);
    fclose(fp);
    return 0;
}
```

    a) `H` b) `e` c) `o` d) Undefined

30. Which function is used to write a single character to a file?

    a) `fputc()` b) `fwrite()` c) `putc()` d) `write()`

Image Processing (LodePNG)

31. What does LodePNG library process?

    a) JPEG images b) PNG images c) BMP images d) All of the above

32. Which function is used to decode a PNG image in LodePNG?

    a) `lodepng_decode32` b) `png_decoder` c) `decode_png` d) `lodepng_image`

33. What type of output does LodePNG decoding provide?

    a) Encoded data b) Raw pixel data c) Grayscale data d) Compressed image data

34. What is the primary purpose of LodePNG?

    a) Image compression b) Reading and writing PNG files c) Editing PNG metadata d) Converting images to grayscale

35. Which language is LodePNG written in?

    a) C b) C++ c) Python d) Java

36. Which of the following is the correct syntax to allocate a 2D array dynamically?

    a) `int **arr = malloc(rows * cols * sizeof(int));` b) `int **arr = malloc(rows * sizeof(int*));` c) `int *arr = malloc(rows * sizeof(int));` d) `int *arr = malloc(rows * cols);`

37. Predict the output of the following code:

```
#include <stdio.h>

#include <stdlib.h>

int main() {

    int *ptr = (int*)malloc(3 * sizeof(int));

    for (int i = 0; i < 3; i++) {

        ptr[i] = i * i;

    }
```

```
    printf("%d", ptr[2]);
    free(ptr);
    return 0;
}
```

a) 1 b) 2 c) 4 d) Undefined

38. What is the output of the following code?

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

a) `10 11`

b) `11 10`

c) `10 10`

d) `Compilation Error`

39. What is the output of the following code?

```
#include <stdio.h>
int main() {
    int x = 5;
    if (x > 0)
        printf("Positive");
    else
        printf("Negative");
    return 0;
```

```
}
```

a) Positive
b) Negative
c) Compilation Error
d) Undefined

40. Which of the following is a valid identifier in C?
    a) `2nd_var`
    b) `_variable`
    c) `main()`
    d) `@value`

41. Which of the following functions is used to compare two strings in C?
    a) `strcmp()`
    b) `strcpy()`
    c) `strcat()`
    d) `strlen()`

42. Predict the output of the following code:

```
#include <stdio.h>
int multiply(int x, int y) {
    return x * y;
}
int main() {
    printf("%d", multiply(3, 4));
    return 0;
}
```

a) 12
b) 7
c) Compilation Error
d) Undefined

43. Which type of function does not return any value?
    a) `void`
    b) `int`
    c) `float`
    d) `char`

44. What will the following code output?

```c
#include <stdio.h>
int main() {
    int arr[5] = {1, 2, 3, 4, 5};
    printf("%d", arr[3]);
    return 0;
}
```

    a) 1
    b) 2
    c) 3
    d) 4

45. Which of the following is true about array declaration in C?
    a) An array can have elements of different data types.
    b) The size of an array must be specified during declaration.
    c) Arrays do not require memory allocation.
    d) Array size is dynamic by default.

46. What will happen if `free()` is called twice on the same pointer?
    a) The program runs successfully.
    b) Undefined behavior occurs.
    c) Memory is reallocated.
    d) Compilation Error.

47. What is the correct syntax to declare a pointer to a `float`?
    a) `float ptr;`
    b) `float *ptr;`

c) `ptr float;`
d) `*ptr float;`

48. What is the size of the following structure?

```
struct Sample {
    int x;
    char y;
    float z;
};
```

a) 9 bytes
b) 12 bytes
c) Compiler-dependent
d) 8 bytes

49. What is the output of the following code if the file `data.txt` contains `42`?

```
#include <stdio.h>
int main() {
    FILE *file = fopen("data.txt", "r");
    int x;
    fscanf(file, "%d", &x);
    printf("%d", x);
    fclose(file);
    return 0;
}
```

a) 42
b) Compilation Error
c) Undefined Behavior
d) File not found

50. Which of the following is true about LodePNG's output?
    a) It always produces grayscale images.
    b) It outputs raw RGBA pixel data by default.
    c) It only supports decoding PNG images.
    d) LodePNG is written in Python.