

Q1. Purpose of main() in C

The main() function is the starting point of every C program. It is where the execution of a program starts. Every C program needs to have a main() function. Its significance includes:

Entry point of program: Execution starts from main()

Return value: Return value is mostly an integer (0 for execution success)

Routine: Used as a central point and it calls other routines.

Example:

```
int main() {  
    printf("Hello, World!");  
    return 0;  
}
```

Q2. Declaration of Variables vs Initialization of Variables

Declaration - This is when the type and name of the variable are given to the compiler, but no value is assigned.

Example:

```
int a; // declaration
```

Initialization: The value is assigned to the variable when it is declared.

Example:

```
int a = 10; // initialization
```

Q3. C Program: Personalized Salutation

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

```
int main() {  
    char name[50];  
    printf("Enter your name: ");  
    scanf("%s", name);  
    printf("Hello, %s! Welcome!\n", name);  
    return 0;  
}
```

}

Q4. Data Types in C

Basic data types:

int - integer, e.g., int age = 25;

Float - decimal, e.g., float height = 5.8;

double - double precision, e.g. double pi = 3.14159;

char - character, as in char grade = 'A';

Derived data types:

Pointers, arrays, structures, and so forth.

Example:

```
int a = 10;
float b = 5.5;
double c = 9.87654321;
char d = 'Z';
```

Q5. Type Conversions

Implicit (Typecasting is automatic by compiler)

Example:

```
int a = 5;
double b = a; // implicit conversion from int to double
```

Prior-to the net days, explicit typecasting (done by programmer)

Example:

```
double x = 9.7;
int y = (int)x; // explicit conversion
```

Q6. Program: Area of a Rectangle

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

```
int main() {  
float length, width, area;  
printf("Enter length: ");  
scanf("%f", &length);  
printf("Enter width: ");  
scanf("%f", &width);  
area = length width;  
printf("Area of rectangle: %.2f\n", area);  
return 0;  
}
```

Q7. Role of scanf()

scanf() is used to get input from the user and save it in variables.

Example:

```
int age;  
printf("Enter your age: ");  
scanf("%d", &age);  
printf("Your age is %d\n", age);
```

%d - format specifier for int.

&age - input variable address (the address to the variable which contains the input).

Q8. Celsius to Fahrenheit

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

```
int main() {  
float celsius, fahrenheit;  
printf("Enter temperature in Celsius: ");  
scanf("%f", &celsius);  
fahrenheit = (celsius * 9 / 5) + 32;  
printf("Temperature in Fahrenheit: %.2f\n", fahrenheit);  
return 0;  
}
```

Q9. Days to Weeks and Days Converter

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

```
int main() {  
    int days, weeks, remaining days;  
    printf("Enter number of days: ");  
    scanf("%d", &days);  
    weeks = days / 7;  
    remainingdays = days % 7;  
    printf("%d days = %d week(s) and %d day(s)\n", days, weeks, remainingdays);  
    return 0;  
}
```

Q10. Replace Temporary Variable With Swift Variable

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

```
int main() {  
    int a, b, temp;  
    printf("Enter two numbers: ");  
    scanf("%d %d", &a, &b);  
    temp = a;  
    a = b;  
    b = temp;  
    printf("a = %d, b = %d after swapping\n", a, b);  
    return 0;  
}
```

Q11. Add, Multiply, Subtract

```
x = (x + 1) * 3 - 10;
```

Q12. Check $a > b$ and $c \neq 0$

```
(a > b) && (c != 0)
```

Q13. Divisible by 2 and 3 without modulus

```
((n / 2) * 2 == n) && ((n / 3) * 3 == n)
```

Q14. Replace With Temporary Variable

```
x = x + y;
```

```
y = x - y;
```

```
x = x - y;
```

Q15. Check Positive and Even

$(n > 0) \ \&\& \ (n \% 2 == 0)$

Q16. Average of Two Variables

$(x + y) / 2.0$

Q17. Check Uppercase Character

$(ch \geq 'A' \ \&\& \ ch \leq 'Z')$

Q18. Sum of the Squares of Three Quantities

$(aa + bb + cc)$

Q19. Check $a == b$ and $b != c$

$(a == b) \ \&\& \ (b != c)$

Q20. Multiple of 3 or 5

$(n \% 3 == 0) \ (n \% 5 == 0)$

Q21. Cycle Swap of Three Variables

`int temp = x;`

`x = y;`

`y = z;`

`z = temp;`

Q22. Square Root of Sum Rounded

$(int)(\sqrt{a + b} + 0.5)$

Q23. Check Power of 2

$(num > 0) \ \&\& \ ((num \ \& \ (num - 1)) == 0)$

Q24. Check Perfect Square

`int sqrtnum = (int)sqrt(n);`

$(sqrtnum * sqrtnum == n)$