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Q1. What is the purpose of the main() function in a C program? Explain its significance.

Ans: The main() function is the entry point for a C program. The execution of the program starts from the main() function. Without the main() function, it is impossible to execute a C program. The main() function regulates the entire execution of the program by invoking other functions and executing statements. The main() function can return an integer value, which is often 0, to the operating system to show that the program has executed successfully.

Q2. Explain the difference between a variable declaration and a variable initialization in C.

Ans: In C programming, declaring a variable is an instruction to the compiler regarding the name and type of variable to be used, so memory can be allocated for it. At this point, no value is assigned to the variable, and it is said to have a garbage value. Example: int x

Variable initialization is an assignment of a value to a variable during declaration. This is done to ensure that the variable is initialized with a value before it is used in the program. Example: int x = 10

Q3. Write a C program to display a personalized greeting message. (Should contain 'hello' or 'welcome' in the message)

```c
#include <stdio.h>

int main() {
    printf("hello");

    return 0;
}
```

Result:

```
PS C:\Users\User\OneDrive\Desktop\C\assignment-1-amritaneupane91-png> cd "c:\Users\User\OneDrive\Desktop\C
\assignment-1-amritaneupane91-png\src\" ; if ($?) { gcc q3.c -o q3 } ; if ($?) { .\q3 }
hello
```

Q4. What are the different data types available in C? Provide examples of each data type.

Ans: The different data types available in C are given below:

a. Basic (Primary) Data Types:

• int: Stores whole numbers (positive or negative).

Example: int age=20;

• float: Stores decimal (floating-point) numbers with single precision.

Example: float temperature=37.5;

• double: Stores decimal numbers with double precision.

Example: double salary = 45678.75

• char: Stores a single character.

Example: char grade = 'A';

Q5. Explain the concept of type conversions in C. Provide examples of implicit and explicit type conversions.

Ans: *Type conversion in C* refers to the process of converting a value from one data type to another. This is necessary because C programs often perform operations on variables of different data types, and the compiler must ensure compatibility between them. Type conversions in C are mainly classified into implicit and explicit type conversion.

Implicit Type Conversion: This conversion is done automatically by the compiler when different data types are used in an expression. Smaller data types are converted into larger ones to avoid data loss.

Example:

int a = 10;

float b = 5.5;

float result = a + b;

Explicit Type Conversion: This conversion is done manually by the programmer using a casting operator.

Example:

int a = 5, b = 2;

float result = (float)a / b;

Q6. Write a C program to calculate the area of a rectangle. Prompt the user to enter the length and width, and display the result.

```c
#include <stdio.h>


int main(){

int length,width;

int area;

printf("Enter the length and width:");

scanf("%d %d",&length,&width);

area=length*width;

printf("The area of rectangle is %d",area);

return 0;

}
```

Result

Q7. What is the role of the scanf() function in C? Provide an example of its usage.

Ans: The scanf() function in C allows you to read input from the user during program execution. It brings in formatted input from the standard input (keyboard) and puts the values into the variables you have specified. This function is declared in stdio.h.

Example:

```
#include <stdio.h>

int main() {

    int age;

    float marks;

   printf("Enter your age and marks: ");

    scanf("%d %f", &age, &marks);

    printf("Age: %d\nMarks: %.2f", age, marks);

    return 0;

}
```

Q8. Write a C program to convert temperature from Celsius to Fahrenheit. Prompt the user for a temperature in Celsius and display the equivalent temperature in Fahrenheit. (Formula: fahrenheit = (celsius * 9 / 5) + 32)

```
#include <stdio.h>



int main(){

    float celsius,fahrenheit;

    printf("Enter the celsius:");

    scanf("%f",&celsius);

    fahrenheit=(celsius*9/5)+32;
```

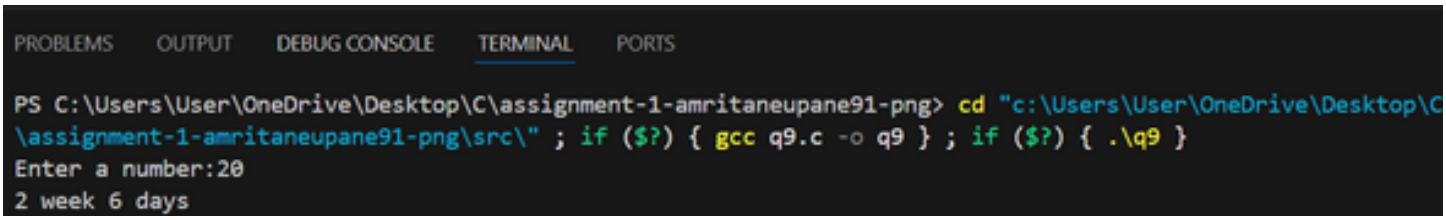
```
    printf("The converted temperature is %f",fahrenheit);

    return 0;

}
```

Result:

Q9. Input a number representing days and print the equivalent number of weeks and days. (Example: 10 days = 1 week and 3 days)

```
#include <stdio.h>

    int main() {

    int number;

    int week,remaining_days;



    printf("Enter a number:");

    scanf("%d",&number);

    week=number/7;

    remaining_days=number%7;

    printf("%d week %d days",week,remaining_days);

    return 0;

}
```

Result:



Q10. Write a C program to swap the values of two variables using a temporary variable.

```
#include <stdio.h>


int main() {
    int x,y;
    int temp;

    printf("Enter two numbers:");
    scanf("%d %d", &x, &y);

    printf("Value of x before swap is %d and y is %d\n", x,y);

    temp = x;
    x=y;
    y=temp;
```

```
    printf("Value of x after swap is %d and y is %d\n", x,y);
```

Result:

```
PS C:\Users\User\OneDrive\Desktop\C\assignment-1-amritaneupane91-png> cd "c:\Users\User\OneDrive\Desktop\
\assignment-1-amritaneupane91-png\src\" ; if ($?) { gcc q10.c -o q10 } ; if ($?) { .\q10 }
Enter two numbers:5 6
Value of x before swap is 5 and y is 6
Value of x after swap is 6 and y is 5
```

Q11. Write a C expression that performs the following operations in a single line: increment a variable by 1, multiply it by 3, and subtract 10

```
#include <stdio.h>

int main(){

    int num;

    int result;

    printf("Enter a variable:");

    scanf("%d",&num);

    result=(num++,num*3-10);

    printf("The result is %d\n",result);

    return 0;

}
```

Result:

Q12. Given three variables a, b, and c, write an expression that checks if a is greater than b and c is not equal to 0.

```c
#include <stdio.h>

int main(){

    int a,b,c;

    int result;

    printf("Enter three variables:");

    scanf("%d %d %d",&a,&b,&c);

    result=(a>b)&&(c!=0);

    printf("The result is %d",result);

    return 0;

}
```

Result:

Q13. Write a C expression that evaluates whether a number is divisible by both 2 and 3 (without using the modulus operator).

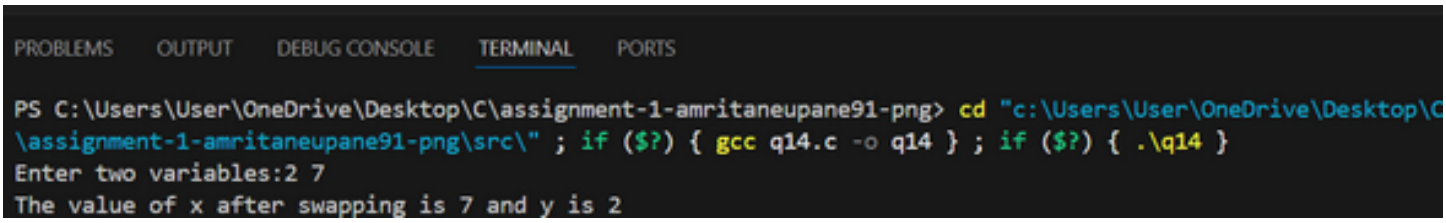
```c
#include <stdio.h>

int main(){

    int n;

    int result;

    printf("Enter a number:");

    scanf("%d",&n);

    result=(n/2*2==n)&&(n/3*3==n);

    printf("The result is %d\n",result);

    return 0;

}
```

Result:

Q14. Create an expression that swaps the values of two variables x and y without using a temporary variable.

```c
#include <stdio.h>

int main(){

    int x,y;

    printf("Enter two variables:");

    scanf("%d %d",&x,&y);

    x=x+y;

    y=x-y;

    x=x-y;

    printf("The value of x after swapping is %d and y is %d\n",x,y);

    return 0;

}
```

Result:

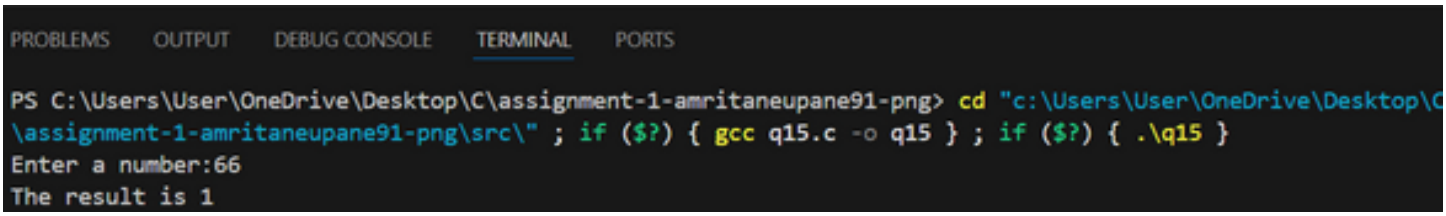


Q15. Write an expression that checks if a number is both positive and even.

```c
#include <stdio.h>

int main(){
```

```c
    int n;
    int result;
    printf("Enter a number:");
    scanf("%d",&n);
    result=(n>0)&&(n%2==0);
    printf("The result is %d\n",result);
    return 0;
}
```

Result:



Q16. Given two variables x and y, write an expression that calculates the average of their values.

```c
#include <stdio.h>
int main(){
    int x,y;
    int avg;
    printf("Enter two variables:");
    scanf("%d %d",&x,&y);
```

```
    avg=(x+y)/2;
    printf("The average of their value is %d\n",avg);
    return 0;
}
```

Result:

Q17. Create an expression that checks if a given character is an uppercase letter.

```
#include <stdio.h>
int main(){
    char a;
    int result;
    printf("Enter a character:");
    scanf("%c",&a);
    result=(a>='A')&&(a<='Z');
    printf("The result is %d\n",result);
    return 0;
}
```

Result:

Q18. Write a C expression that calculates the sum of the squares of three different numbers.

```
#include <stdio.h>

int main(){

    int a,b,c;

    int sum;

    printf("Enter three different numbers:");

    scanf("%d %d %d",&a,&b,&c);

    sum=(a*a)+(b*b)+(c*c);

    printf("The sum of three different numbers is %d\n",sum);

    return 0;

}
```

Result:

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS C:\Users\User\OneDrive\Desktop\C\assignment-1-amritaneupane91-png> cd "c:\Users\User\OneDrive\Desktop\C
\assignment-1-amritaneupane91-png\src\" ; if ($?) { gcc q18.c -o q18 } ; if ($?) { .\q18 }
Enter three different numbers:2 7 9
The sum of three different numbers is 134
```

Q19. Given three variables a, b, and c, write an expression that checks if a is equal to b and b is not equal to c.

```c
#include <stdio.h>

int main(){

    int a,b,c;

    int result;

    printf("Enter three variables:");

    scanf("%d %d %d",&a,&b,&c);

    result=(a==b)&&(b!=c);

    printf("The result is %d\n",result);

    return 0;

}
```

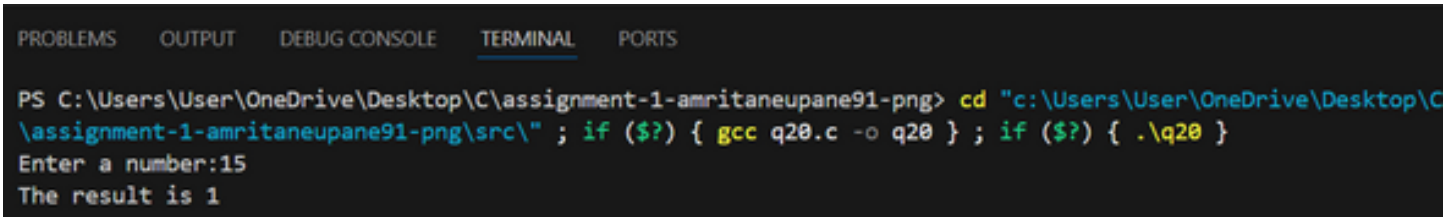
Result:

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS C:\Users\User\OneDrive\Desktop\C\assignment-1-amritaneupane91-png> cd "c:\Users\User\OneDrive\Desktop\C
\assignment-1-amritaneupane91-png\src\" ; if ($?) { gcc q19.c -o q19 } ; if ($?) { .\q19 }
Enter three variables:32 21 22
The result is 0
```

Q20. Write an expression that checks if a number is a multiple of either 3 or 5.

```c
#include <stdio.h>

int main(){

    int n;

    int result;

    printf("Enter a number:");

    scanf("%d",&n);

    result=(n%3==0)||(n%5==0);

    printf("The result is %d\n",result);

    return 0;

}
```

Result:



Q21. Create an expression that swaps the values of three variables x, y, and z in a cyclic order (i.e., x becomes y, y becomes z, and z becomes x).

```c
#include <stdio.h>

int main(){

    int x,y,z;
```

```
    int temp;
    printf("Enter three variables:");
    scanf("%d %d %d",&x,&y,&z);
    printf("The value of x before swapping is %d, y is %d and z is %d\n",x,y,z);
    temp=x;
    x=y;
    y=z;
    z=temp;
    printf("The value of x after swapping is %d, y is %d and z is %d\n",x,y,z);
    return 0;
}
```

Result:

Q22. Write a C expression that calculates the square root of the sum of two numbers, rounded to the nearest integer.

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

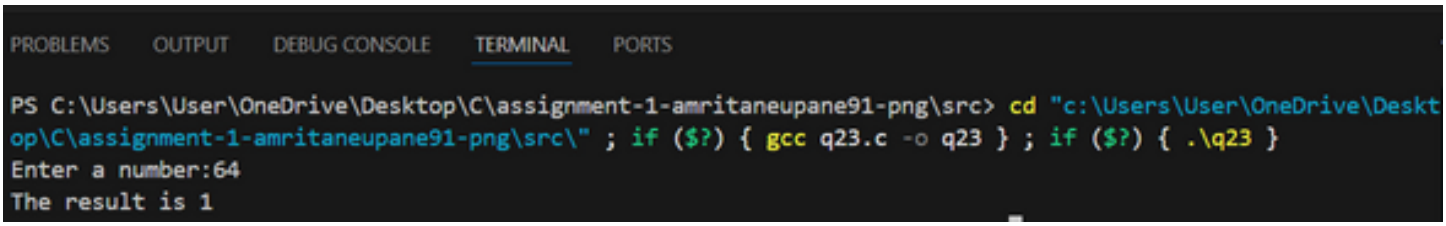
```c
int main (){


int x,y;

int sum;

printf(" Enter two numbers:");

scanf("%d %d", &x, &y);


sum= round(sqrt(x)+sqrt(y));


printf("The sum is %d\n", sum);


return 0;


}
```

Result:

Q23. Given a variable num, write an expression that checks if it is a power of 2.

```c
#include <stdio.h>

int main (){

int num;
int result;

printf("Enter a number:");
scanf("%d", &num);

result= !(num & (num -1));

printf("The result is %d\n", result);

return 0;

}
```

Result:



Q24. Create an expression that checks if a given number is a perfect square.

```
#include <stdio.h>

#include <math.h>



int main () {


    int num;

    int result;


    printf("Enter a number:");

    scanf("%d", &num);


    result= (sqrt(num)*sqrt(num)==num);


    printf("the result is %d\n", result);


    return 0;
```

}

Result:


PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
PS C:\Users\User\OneDrive\Desktop\C\assignment-1-amritaneupane91-png> cd "c:\Users\User\OneDrive\Desktop\C
\assignment-1-amritaneupane91-png\src\" ; if ($?) { gcc q24.c -o q24 } ; if ($?) { .\q24 }
Enter a number:16
the result is 1