Practical File of Problem-Solving using C Programming- 22CS002

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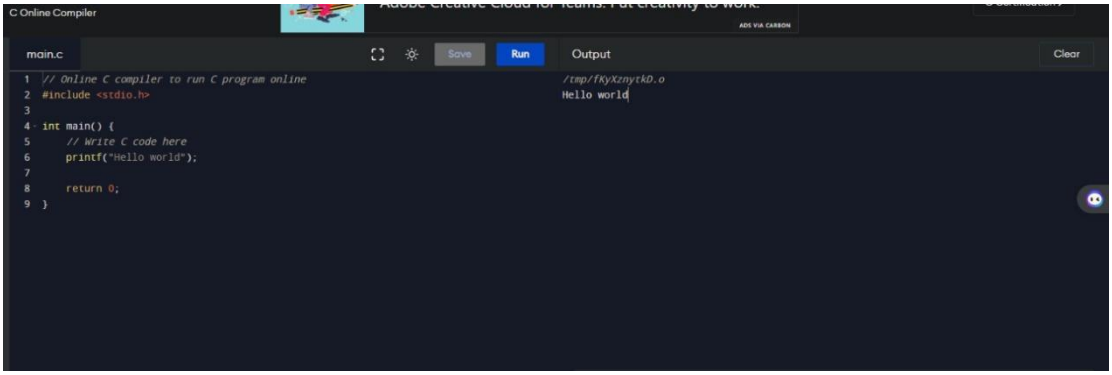
PRACTICAL 1

Write a program to show the use to input (Scanf)/output (Printf) statements and block structure of C-program by highlighting the features of “stdio.h”.

Code:

```
 // Online C compiler to run C program online
#include <stdio.h>

int main() {
// write C code here
printf("Hello world");

return 0;
}
```

Snip:



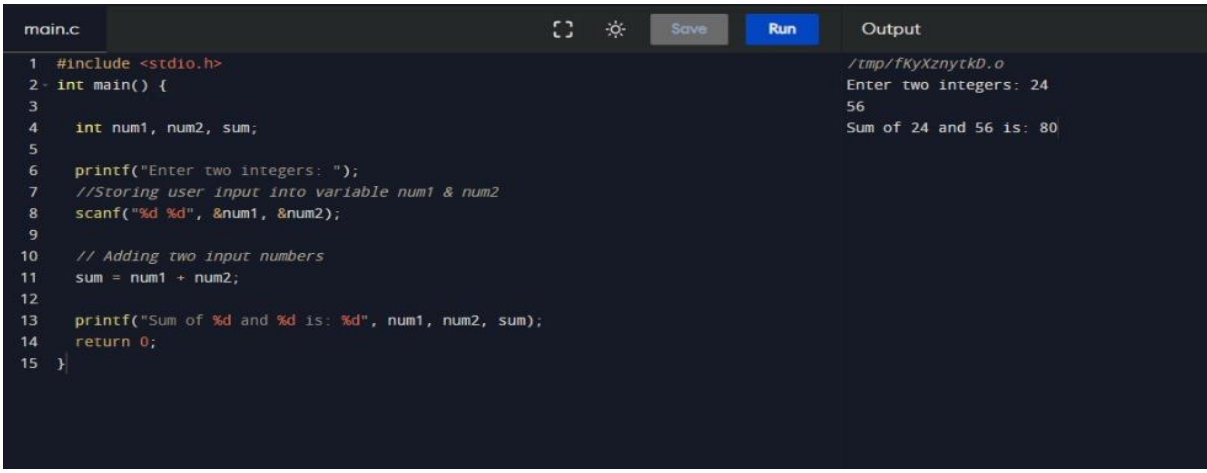
PRACTICAL 2

Write a program to add two numbers and display the sum.

Code:

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

    int number1, number2, sum;

    printf("Enter two integers: ");
    scanf("%d %d", &number1, &number2);

    // calculate the sum
    sum = number1 + number2;

    printf("%d + %d = %d", number1, number2, sum);
    return 0;
}
```

Snip:



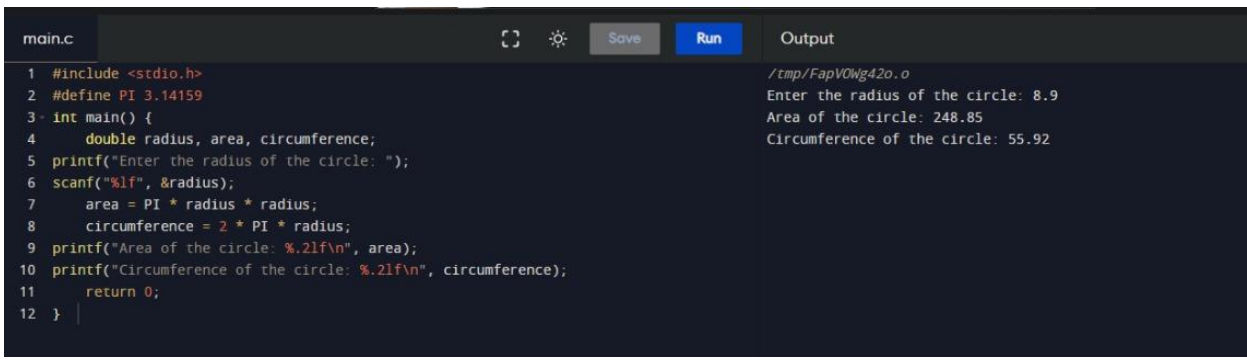
PRACTICAL 3

Write a program to calculate the area and the circumference of a circle by using radius as the input provided by the user

Code:

```
#include <stdio.h>
#define PI 3.14159
int main() {
    double radius, area, circumference;
printf("Enter the radius of the circle: ");
scanf("%lf", &radius);
    area = PI * radius * radius;
    circumference = 2 * PI * radius;
printf("Area of the circle: %.2lf\n", area);
printf("Circumference of the circle: %.2lf\n", circumference);
    return 0;
}
```

Snip:



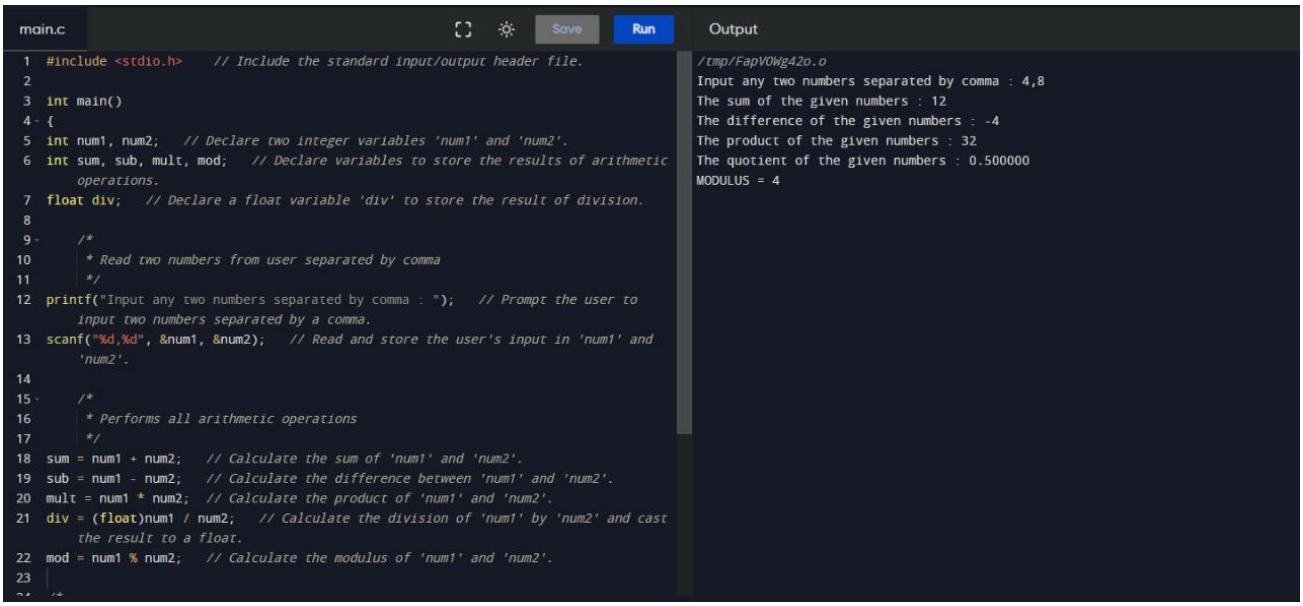
PRACTICAL 4

Write a program to perform addition, subtraction, divion and multiplication of tqwo numbers given as input by user.

Code:

```
#include <stdio.h>    // Include the standard input/output header file.

int main()
{
int num1, num2;   // Declare two integer variables 'num1' and 'num2'.
int sum, sub, mult, mod;   // Declare variables to store the results of arithmetic operations.
float div;   // Declare a float variable 'div' to store the result of division.

    /*
     * Read two numbers from user separated by comma
     */
printf("Input any two numbers separated by comma : ");

// Prompt the user to input two numbers separated by a comma.
scanf("%d,%d", &num1, &num2);   // Read and store the user's input in 'num1' and 'num2'.

    /*
     * Performs all arithmetic operations
     */
sum = num1 + num2;   // Calculate the sum of 'num1' and 'num2'.
sub = num1 - num2;   // Calculate the difference between 'num1' and 'num2'.
mult = num1 * num2;  // Calculate the product of 'num1' and 'num2'.
div = (float)num1 / num2;   // Calculate the division of 'num1' by 'num2' and cast the result to a float.
mod = num1 % num2;   // Calculate the modulus of 'num1' and 'num2'.

    /*
     * Prints the result of all arithmetic operations
     */
printf("The sum of the given numbers : %d\n", sum);   // Print the sum.
printf("The difference of the given numbers : %d\n", sub);   // Print the difference.
printf("The product of the given numbers : %d\n", mult);   // Print the product.
printf("The quotient of the given numbers : %f\n", div);   // Print the quotient.
printf("MODULUS = %d\n", mod);   // Print the modulus.

return 0;   // Return 0 to indicate successful execution of the program.
}
```

Snip:


main.c
Save
Run
Output
#include <stdio.h> // Include the standard input/output header file.
int main()
{
int num1, num2; // Declare two integer variables 'num1' and 'num2'.
int sum, sub, mult, mod; // Declare variables to store the results of arithmetic operations.
float div; // Declare a float variable 'div' to store the result of division.
/*
* Read two numbers from user separated by comma
*/
printf("Input any two numbers separated by comma : "); // Prompt the user to input two numbers separated by a comma.
scanf("%d,%d", &num1, &num2); // Read and store the user's input in 'num1' and 'num2'.
/*
* Performs all arithmetic operations
*/
sum = num1 + num2; // Calculate the sum of 'num1' and 'num2'.
sub = num1 - num2; // Calculate the difference between 'num1' and 'num2'.
mult = num1 * num2; // Calculate the product of 'num1' and 'num2'.
div = (float)num1 / num2; // Calculate the division of 'num1' by 'num2' and cast the result to a float.
mod = num1 % num2; // Calculate the modulus of 'num1' and 'num2'.
/tmp/FapVOWg42o.o
Input any two numbers separated by comma : 4,8
The sum of the given numbers : 12
The difference of the given numbers : -4
The product of the given numbers : 32
The quotient of the given numbers : 0.500000
MODULUS = 4

PRACTICAL 5

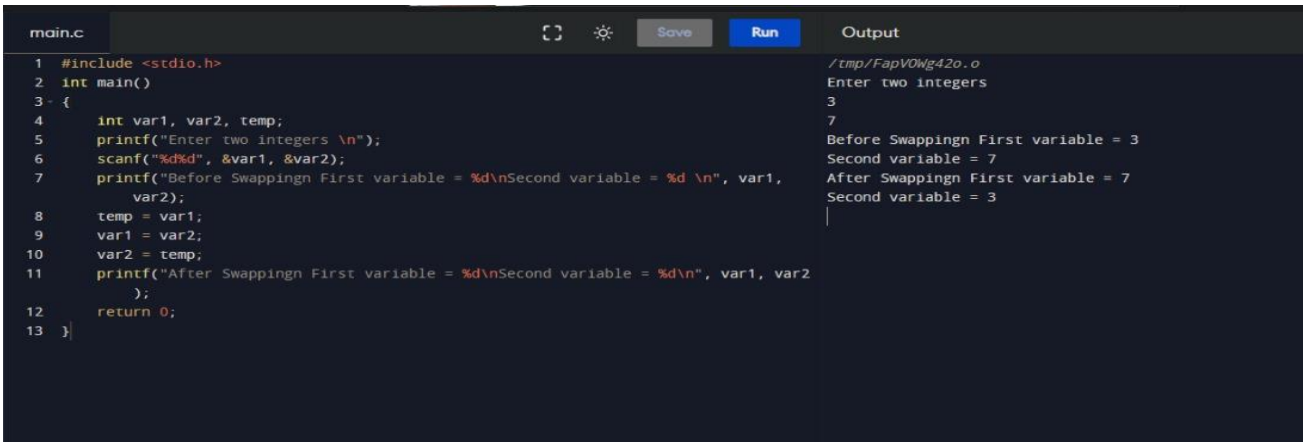
Write a program to swap two variable;

1. By using temporary variable.

Code:

```
#include <stdio.h>
int main()
{
   int var1, var2, temp;
   printf("Enter two integers \n");
   scanf("%d%d", &var1, &var2);
   printf("Before Swappingn First variable = %d\nSecond variable = %d \n", var1, var2);
   temp = var1;
   var1 = var2;
   var2 = temp;
   printf("After Swappingn First variable = %d\nSecond variable = %d\n", var1, var2);
   return 0;
}
```

Snip:

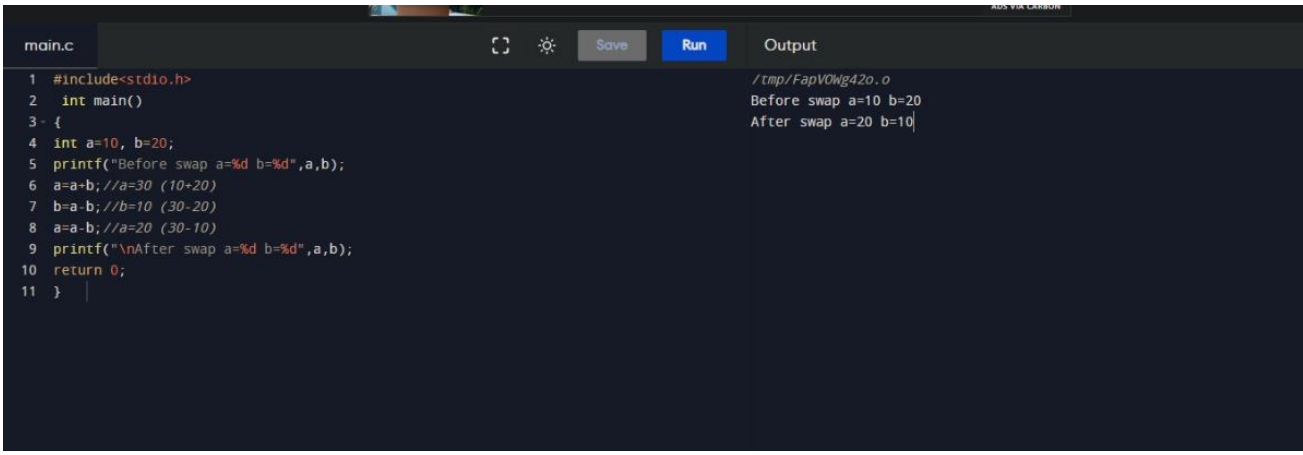


2. Without using temporary variable.

Code:

```
#include<stdio.h>
int main()
{
int a=10, b=20;
printf("Before swap a=%d b=%d",a,b);
a=a+b;//a=30 (10+20)
b=a-b;//b=10 (30-20)
a=a-b;//a=20 (30-10)
printf("\nAfter swap a=%d b=%d",a,b);
return 0;
}
```

Snip:



PRACTICAL 6

Write a progam to evaluate each of the following equations.

1. V=u+at

Code:

```
#include <stdio.h>

int main() {
    double u, v, a, t;

    // Input values for variables
    printf("Enter the value of u: ");
    scanf("%lf", &u);

    printf("Enter the value of a: ");
    scanf("%lf", &a);

    printf("Enter the value of t: ");
    scanf("%lf", &t);

    // Equation: v = u + at
    v = u + (a * t);
    printf("v = %lf\n", v);

    return 0;
}
```

Snip:

main.c

Save Run

```c
#include <stdio.h>

int main() {
    double u, v, a, t;

    // Input values for variables
    printf("Enter the value of u: ");
    scanf("%lf", &u);

    printf("Enter the value of a: ");
    scanf("%lf", &a);

    printf("Enter the value of t: ");
    scanf("%lf", &t);

    // Equation: v = u + at
    v = u + (a * t);
    printf("v = %lf\n", v);

    return 0;
}
```

Output Clear

```
/tmp/TnNzVGXCUg.o
Enter the value of u: 69
Enter the value of a: 96
Enter the value of t: 99
v = 9573.000000
```

2.S=ut+1/2at^2

Code:

```
#include <stdio.h>

int main() {
    double u, s, a, t;

    // Input values for variables
    printf("Enter the value of u: ");
    scanf("%lf", &u);

    printf("Enter the value of a: ");
    scanf("%lf", &a);

    printf("Enter the value of t: ");
    scanf("%lf", &t);

    // Equation: s = ut + 0.5 * a * t^2
    s = u * t + 0.5 * a * t * t;
    printf("s = %lf\n", s);

    return 0;
}
```

Snip:

main.c

Save Run

```c
#include <stdio.h>

int main() {
    double u, s, a, t;

    // Input values for variables
    printf("Enter the value of u: ");
    scanf("%lf", &u);

    printf("Enter the value of a: ");
    scanf("%lf", &a);

    printf("Enter the value of t: ");
    scanf("%lf", &t);

    // Equation: s = ut + 0.5 * a * t^2
    s = u * t + 0.5 * a * t * t;
    printf("s = %lf\n", s);

    return 0;
}
```

Output

Clear

```
/tmp/TnNzVGXCUg.o
Enter the value of u: 69
Enter the value of a: 96
Enter the value of t: 66
s = 213642.000000
```

1. T=2*a+(b+9c)^1/2

Code:

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

int main() {
    double a, b, c, t;

    // Input values for variables
    printf("Enter the value of a: ");
    scanf("%lf", &a);

    printf("Enter the value of b: ");
    scanf("%lf", &b);

    printf("Enter the value of c: ");
    scanf("%lf", &c);

    // Equation: t = 2*a + sqrt(b) + 9*c
    t = 2 * a + sqrt(b) + 9 * c;
    printf("t = %lf\n", t);

    return 0;
}
```

Snip:

main.c

Save Run

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

int main() {
    double a, b, c, t;

    // Input values for variables
    printf("Enter the value of a: ");
    scanf("%lf", &a);

    printf("Enter the value of b: ");
    scanf("%lf", &b);

    printf("Enter the value of c: ");
    scanf("%lf", &c);

    // Equation: t = 2*a + sqrt(b) + 9*c
    t = 2 * a + sqrt(b) + 9 * c;
    printf("t = %lf\n", t);

    return 0;
}
```

Output Clear

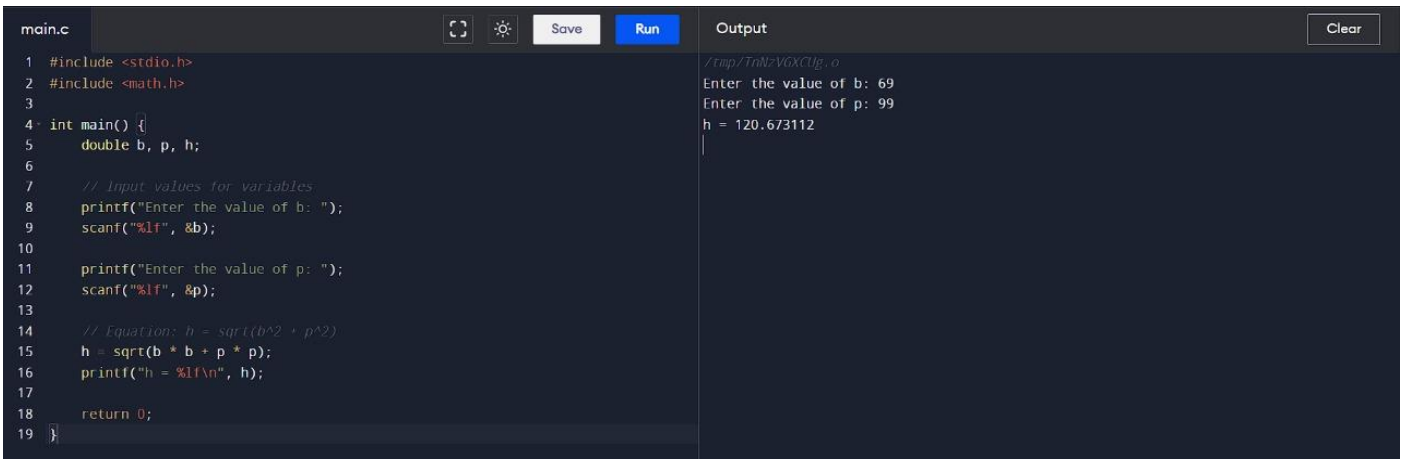
```
/tmp/InNzVGXCUg.o
Enter the value of a: 66
Enter the value of b: 99
Enter the value of c: 69
t = 762.949874
```

4. H=(b^2+p^2)^1/2

Code:

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

int main() {
    double b, p, h;

    // Input values for variables
    printf("Enter the value of b: ");
    scanf("%lf", &b);

    printf("Enter the value of p: ");
    scanf("%lf", &p);

    // Equation: h = sqrt(b^2 + p^2)
    h = sqrt(b * b + p * p);
    printf("h = %lf\n", h);

    return 0;
}
```

Snip:



PRACTICAL 7

Write the following programs usinswitch case statement;

1. To check whether a number is positive,negative or zero.

Code:

```
#include <stdio.h>

int main() {
    int number;

    // Prompt user for input
    printf("Enter a number: ");
    scanf("%d", &number);

    switch (number > 0 ? 1 : (number < 0 ? -1 : 0)) {
        case 1:
            printf("%d is positive.\n", number);
            break;
        case -1:
            printf("%d is negative.\n", number);
            break;
        case 0:
            printf("%d is zero.\n", number);
            break;
    }

    return 0;
}
```

Snip:

main.c

Save Run

```c
#include <stdio.h>

int main() {
    int number;

    // Prompt user for input
    printf("Enter a number: ");
    scanf("%d", &number);

    switch (number > 0 ? 1 : (number < 0 ? -1 : 0)) {
        case 1:
            printf("%d is positive.\n", number);
            break;
        case -1:
            printf("%d is negative.\n", number);
            break;
        case 0:
            printf("%d is zero.\n", number);
            break;
    }

    return 0;
}
```

Output

Clear

```
/tmp/JKjnYgirbj.o
Enter a number: 69
69 is positive.
```

1. To check that an input alphabet is vowel or consonant.

Code:

```
#include <stdio.h>

int main() {
    char alphabet;

    // Prompt user for input
    printf("Enter an alphabet: ");
    scanf("%c", &alphabet);

    switch (alphabet) {
        case 'a':
        case 'e':
        case 'i':
        case 'o':
        case 'u':
        case 'A':
        case 'E':
        case 'I':
        case 'O':
        case 'U':
            printf("%c is a vowel.\n", alphabet);
            break;
        default:
            printf("%c is a consonant.\n", alphabet);
    }

    return 0;
}
```

Snip:

main.c

Save Run

```c
#include <stdio.h>

int main() {
    char alphabet;

    // Prompt user for input
    printf("Enter an alphabet: ");
    scanf("%c", &alphabet);

    switch (alphabet) {
        case 'a':
        case 'e':
        case 'i':
        case 'o':
        case 'u':
        case 'A':
        case 'E':
        case 'I':
        case 'O':
        case 'U':
            printf("%c is a vowel.\n", alphabet);
            break;
        default:
            printf("%c is a consonant.\n", alphabet);
    }

    return 0;
}
```

Output

Clear

```
/tmp/JKjnYgirbj.o
Enter an alphabet: m
m is a consonant.
```

PRACTICAL 8

Write a progam to find he greatest among three numbers using;

1. Conditional operator

Code:

```
#include <stdio.h>

int main() {
    int num1, num2, num3, max;

    // Input three numbers
    printf("Enter three numbers: ");
    scanf("%d %d %d", &num1, &num2, &num3);

    // Using conditional operator to find the maximum
    max = (num1 > num2) ? ((num1 > num3) ? num1 : num3) : ((num2 > num3) ? num2 : num3);

    // Display the result
    printf("The greatest number is: %d\n", max);

    return 0;
}
```

Snip:

main.c

Save Run

```c
#include <stdio.h>

int main() {
    int num1, num2, num3, max;

    // Input three numbers
    printf("Enter three numbers: ");
    scanf("%d %d %d", &num1, &num2, &num3);

    // Using conditional operator to find the maximum
    max = (num1 > num2) ? ((num1 > num3) ? num1 : num3) : ((num2 > num3) ? num2 :
        num3);

    // Display the result
    printf("The greatest number is: %d\n", max);

    return 0;
}
```

Output Clear

```
/tmp/JKjnYgirbj.o
Enter three numbers: 55 66 77
The greatest number is: 77
```

2. If-else statement

Code:

```
#include <stdio.h>

int main() {
    int num1, num2, num3;

    // Input three numbers
    printf("Enter three numbers: ");
    scanf("%d %d %d", &num1, &num2, &num3);

    // Check and find the greatest
    if (num1 >= num2 && num1 >= num3)
        printf("The greatest number is: %d\n", num1);
    else if (num2 >= num1 && num2 >= num3)
        printf("The greatest number is: %d\n", num2);
    else
        printf("The greatest number is: %d\n", num3);

    return 0;
}
```

Snip: