

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

**Submitted in partial fulfillment for the award of the degree of**

**BACHELOR OF ENGINEERING**  
*In*  
**COMPUTER SCIENCE & ENGINEERING**



**CHITKARA UNIVERSITY**

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December, 2023

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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”.

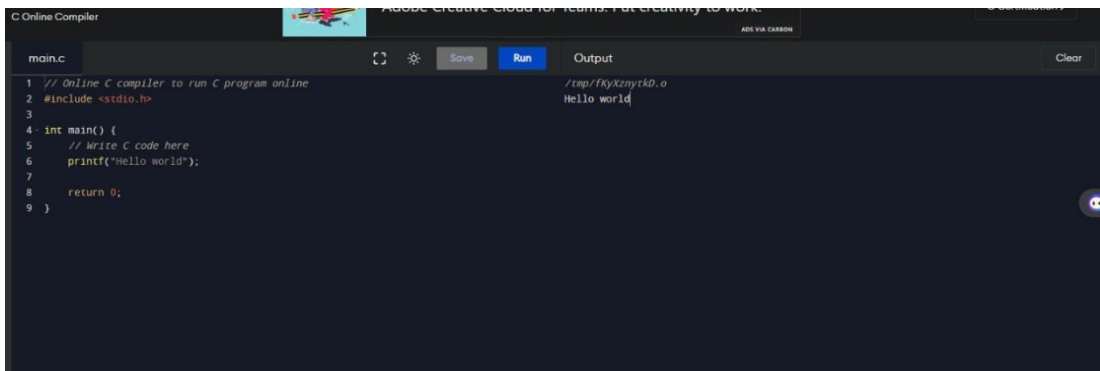
## Code:

```
// 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:



```
main.c  [Icons]  Save  Run  Output
1  #include <stdio.h>
2  int main() {
3
4      int num1, num2, sum;
5
6      printf("Enter two integers: ");
7      //Storing user input into variable num1 & num2
8      scanf("%d %d", &num1, &num2);
9
10     // Adding two input numbers
11     sum = num1 + num2;
12
13     printf("Sum of %d and %d is: %d", num1, num2, sum);
14     return 0;
15 }
```

/tmp/fKyXznytK0.o  
Enter two integers: 24  
56  
Sum of 24 and 56 is: 80

# 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:



The screenshot shows a code editor window with a file named 'main.c'. The code is a C program that calculates the area and circumference of a circle. The output window shows the program's execution with the input radius 8.9 and the resulting area 248.85 and circumference 55.92.

```
main.c  [Icons]  Save  Run  Output
1  #include <stdio.h>
2  #define PI 3.14159
3  int main() {
4      double radius, area, circumference;
5      printf("Enter the radius of the circle: ");
6      scanf("%lf", &radius);
7      area = PI * radius * radius;
8      circumference = 2 * PI * radius;
9      printf("Area of the circle: %.2lf\n", area);
10     printf("Circumference of the circle: %.2lf\n", circumference);
11     return 0;
12 }
```

Output: /tmp/FapV0Wg42o.o  
Enter the radius of the circle: 8.9  
Area of the circle: 248.85  
Circumference of the circle: 55.92

# PRACTICAL 4

Write a program to perform addition, subtraction, division and multiplication of two 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

1 #include <stdio.h> // Include the standard input/output header file.
2
3 int main()
4 {
5     int num1, num2; // Declare two integer variables 'num1' and 'num2'.
6     int sum, sub, mult, mod; // Declare variables to store the results of arithmetic
    operations.
7     float div; // Declare a float variable 'div' to store the result of division.
8
9     /*
10      * Read two numbers from user separated by comma
11      */
12     printf("Input any two numbers separated by comma : "); // Prompt the user to
    input two numbers separated by a comma.
13     scanf("%d,%d", &num1, &num2); // Read and store the user's input in 'num1' and
    'num2'.
14
15     /*
16      * Performs all arithmetic operations
17      */
18     sum = num1 + num2; // Calculate the sum of 'num1' and 'num2'.
19     sub = num1 - num2; // Calculate the difference between 'num1' and 'num2'.
20     mult = num1 * num2; // Calculate the product of 'num1' and 'num2'.
21     div = (float)num1 / num2; // Calculate the division of 'num1' by 'num2' and cast
    the result to a float.
22     mod = num1 % num2; // Calculate the modulus of 'num1' and 'num2'.
23 }
24
```

```
//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

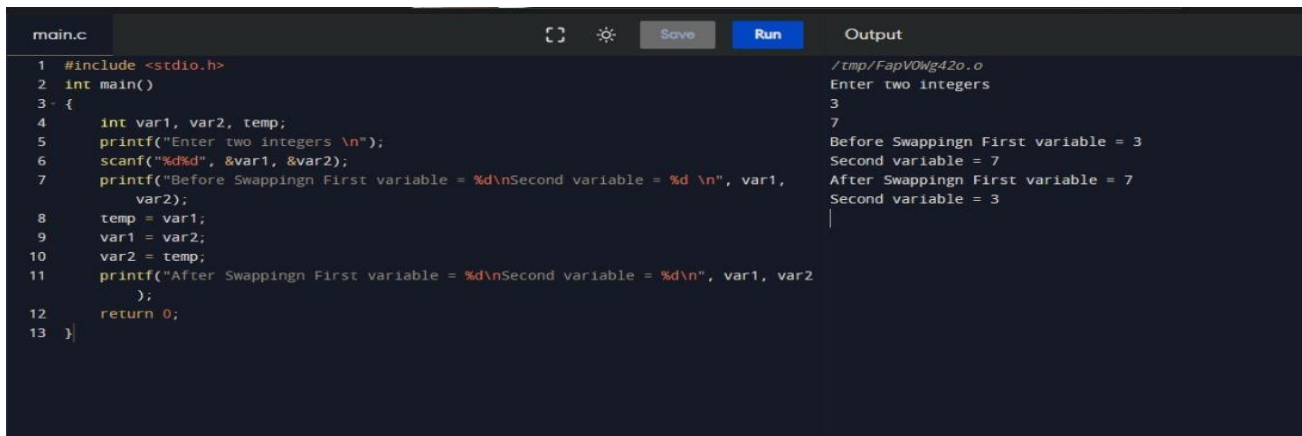
Write a program to swap two variable;

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:



```
main.c  [Icons]  Save  Run  Output
1  #include <stdio.h>
2  int main()
3  {
4      int var1, var2, temp;
5      printf("Enter two integers \n");
6      scanf("%d%d", &var1, &var2);
7      printf("Before Swappingn First variable = %d\nSecond variable = %d \n", var1,
            var2);
8      temp = var1;
9      var1 = var2;
10     var2 = temp;
11     printf("After Swappingn First variable = %d\nSecond variable = %d\n", var1, var2
            );
12     return 0;
13 }
```

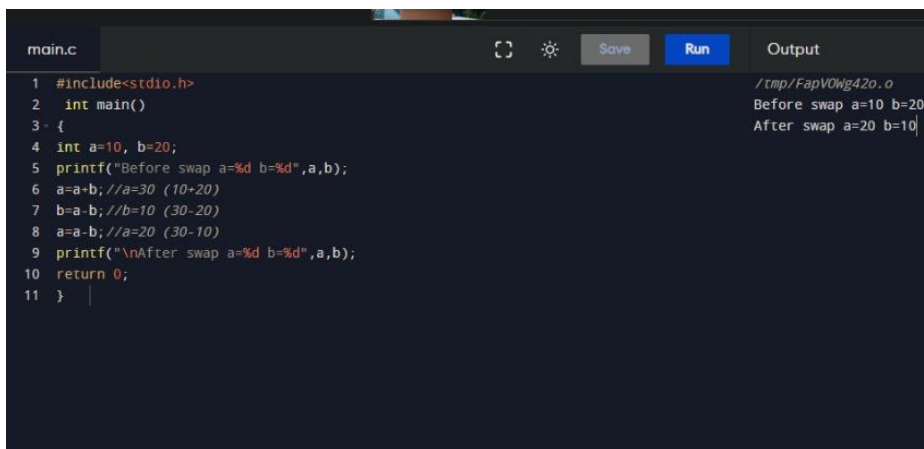
/tmp/FapV0Wg42o.o  
Enter two integers  
3  
7  
Before Swappingn First variable = 3  
Second variable = 7  
After Swappingn First variable = 7  
Second variable = 3

## 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:

A screenshot of a code editor window titled 'main.c'. The editor contains the C code for swapping two numbers without a temporary variable. The code is as follows:

```
1 #include<stdio.h>
2 int main()
3 {
4 int a=10, b=20;
5 printf("Before swap a=%d b=%d",a,b);
6 a=a+b;//a=30 (10+20)
7 b=a-b;//b=10 (30-20)
8 a=a-b;//a=20 (30-10)
9 printf("\nAfter swap a=%d b=%d",a,b);
10 return 0;
11 }
```

The editor has a dark theme. To the right of the code editor is an 'Output' panel showing the execution results:

```
/tmp/FapV0Wg42o.o
Before swap a=10 b=20
After swap a=20 b=10
```

At the top of the editor window, there are icons for file operations and a 'Run' button.

# PRACTICAL 6

Write a program 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

SaveRun

1#include <stdio.h>

2

3int main() {

4double u, v, a, t;

5

6// Input values for variables

7printf("Enter the value of u: ");

8scanf("%lf", &u);

9

10printf("Enter the value of a: ");

11scanf("%lf", &a);

12

13printf("Enter the value of t: ");

14scanf("%lf", &t);

15

16// Equation: v = u + at

17v = u + (a \* t);

18printf("v = %lf\n", v);

19

20return 0;

21}

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

```
1 #include <stdio.h>
2
3 int main() {
4     double u, s, a, t;
5
6     // Input values for variables
7     printf("Enter the value of u: ");
8     scanf("%lf", &u);
9
10    printf("Enter the value of a: ");
11    scanf("%lf", &a);
12
13    printf("Enter the value of t: ");
14    scanf("%lf", &t);
15
16    // Equation: s = ut + 0.5 * a * t^2
17    s = u * t + 0.5 * a * t * t;
18    printf("s = %lf\n", s);
19
20    return 0;
21 }
```

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

SaveRun

```
1 #include <stdio.h>
2 #include <math.h>
3
4 int main() {
5     double a, b, c, t;
6
7     // Input values for variables
8     printf("Enter the value of a: ");
9     scanf("%lf", &a);
10
11     printf("Enter the value of b: ");
12     scanf("%lf", &b);
13
14     printf("Enter the value of c: ");
15     scanf("%lf", &c);
16
17     // Equation: t = 2*a + sqrt(b) + 9*c
18     t = 2 * a + sqrt(b) + 9 * c;
19     printf("t = %lf\n", t);
20
21     return 0;
22 }
```

Output

Clear

/tmp/TrNzVGXCUg.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:



The screenshot shows a code editor with a file named 'main.c'. The code is a C program that calculates the value of h using the equation  $h = \sqrt{b^2 + p^2}$ . The code includes the necessary headers, declares variables, prompts the user for input, and prints the result. The output window shows the program's execution with the inputs b=69 and p=99, resulting in h=120.673112.

```
main.c
1 #include <stdio.h>
2 #include <math.h>
3
4 int main() {
5     double b, p, h;
6
7     // Input values for variables
8     printf("Enter the value of b: ");
9     scanf("%lf", &b);
10
11     printf("Enter the value of p: ");
12     scanf("%lf", &p);
13
14     // Equation: h = sqrt(b^2 + p^2)
15     h = sqrt(b * b + p * p);
16     printf("h = %lf\n", h);
17
18     return 0;
19 }
```

Output

```
/tmp/TrnZVGXCUg.o
Enter the value of b: 69
Enter the value of p: 99
h = 120.673112
```

# PRACTICAL 7

Write the following programs using switch 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

Output

Clear

```
1 #include <stdio.h>
2
3 int main() {
4     int number;
5
6     // Prompt user for input
7     printf("Enter a number: ");
8     scanf("%d", &number);
9
10    switch (number > 0 ? 1 : (number < 0 ? -1 : 0)) {
11        case 1:
12            printf("%d is positive.\n", number);
13            break;
14        case -1:
15            printf("%d is negative.\n", number);
16            break;
17        case 0:
18            printf("%d is zero.\n", number);
19            break;
20    }
21
22    return 0;
23 }
```

/tmp/\_KjnYgIrBj.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

```
1 #include <stdio.h>
2
3 int main() {
4     char alphabet;
5
6     // Prompt user for input
7     printf("Enter an alphabet: ");
8     scanf("%c", &alphabet);
9
10    switch (alphabet) {
11        case 'a':
12        case 'e':
13        case 'i':
14        case 'o':
15        case 'u':
16        case 'A':
17        case 'E':
18        case 'I':
19        case 'O':
20        case 'U':
21            printf("%c is a vowel.\n", alphabet);
22            break;
23        default:
24            printf("%c is a consonant.\n", alphabet);
25    }
26
27    return 0;
28 }
```

Output

Clear

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

# PRACTICAL 8

Write a program to find the 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

Output

Clear

```
1 #include <stdio.h>
2
3 int main() {
4     int num1, num2, num3, max;
5
6     // Input three numbers
7     printf("Enter three numbers: ");
8     scanf("%d %d %d", &num1, &num2, &num3);
9
10    // Using conditional operator to find the maximum
11    max = (num1 > num2) ? ((num1 > num3) ? num1 : num3) : ((num2 > num3) ? num2 :
12        num3);
13
14    // Display the result
15    printf("The greatest number is: %d\n", max);
16
17    return 0;
18 }
```

/tmp/.JKjnYg1rbj.o  
Enter three numbers: 55 66 77  
The greatest number is: 77

## 2. If-else statement

Code:

```
#include <stdio.h>

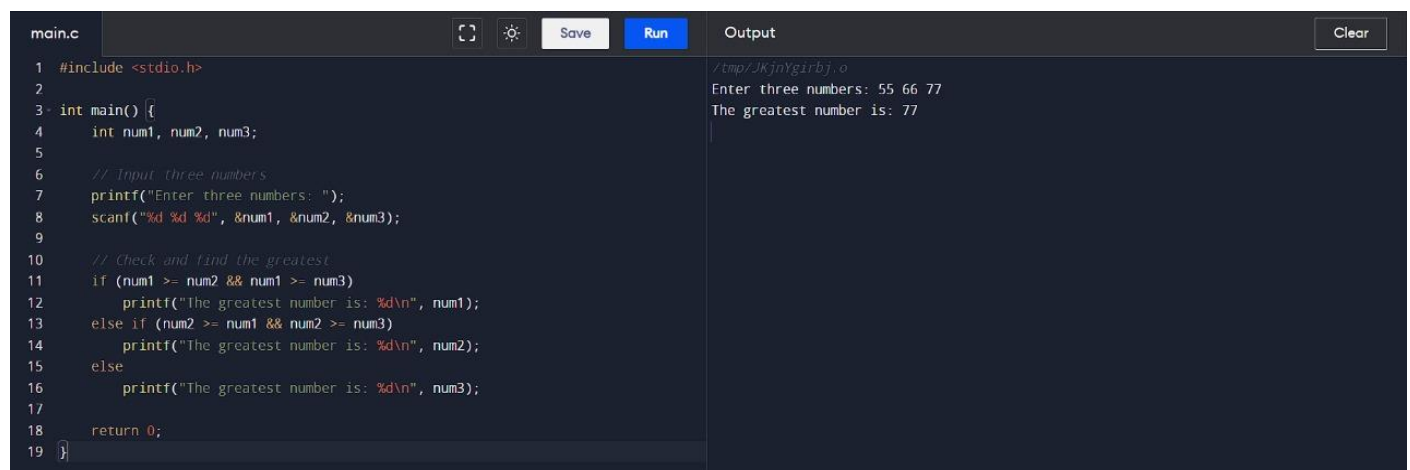
int main() {
    int num1, num2, num3;

    // 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:



```
main.c  [ ] [ ] Save Run Output Clear
1 #include <stdio.h>
2
3 int main() {
4     int num1, num2, num3;
5
6     // Input three numbers
7     printf("Enter three numbers: ");
8     scanf("%d %d %d", &num1, &num2, &num3);
9
10    // Check and find the greatest
11    if (num1 >= num2 && num1 >= num3)
12        printf("The greatest number is: %d\n", num1);
13    else if (num2 >= num1 && num2 >= num3)
14        printf("The greatest number is: %d\n", num2);
15    else
16        printf("The greatest number is: %d\n", num3);
17
18    return 0;
19 }
```

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



