

C PROGRAMING / LINUX [DASL-100]

WEEK 2 [Section 3]

INSTRUCTOR: JEAN CHAGAS VAZ

➤ C Program to Check Whether a Character is Vowel or Consonant

➤ Logical Operators

Operator	Meaning of Operator	Example
&&	Logical AND. True only if all operands are true	If c = 5 and d = 2 then, expression <code>((c == 5) && (d > 5))</code> equals to 0.
	Logical OR. True only if either one operand is true	If c = 5 and d = 2 then, expression <code>((c == 5) (d > 5))</code> equals to 1.
!	Logical NOT. True only if the operand is 0	If c = 5 then, expression <code>!(c == 5)</code> equals to 0.



➤ Relational Operators

Operator	Meaning of Operator	Example
==	Equal to	5 == 3 returns 0
>	Greater than	5 > 3 returns 1
<	Less than	5 < 3 returns 0
!=	Not equal to	5 != 3 returns 1
>=	Greater than or equal to	5 >= 3 returns 1
<=	Less than or equal to	5 <= 3 return 0



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➤ C Program to Check Whether a Character is Vowel or Consonant

➤ In this example, if...else statement is used to check whether an alphabet entered by the user is a vowel or a constant. an integer is divided by another integer.

```
#include <stdio.h>
int main()
{
    char c;
    int isLowercaseVowel, isUppercaseVowel;

    printf("Enter an alphabet: ");
    scanf("%c",&c);

    // evaluates to 1 (true) if c is a lowercase vowel
    isLowercaseVowel = (c == 'a' || c == 'e' || c == 'i' || c == 'o' || c == 'u');

    // evaluates to 1 (true) if c is an uppercase vowel
    isUppercaseVowel = (c == 'A' || c == 'E' || c == 'I' || c == 'O' || c == 'U');

    // evaluates to 1 (true) if either isLowercaseVowel or isUppercaseVowel is true
    if (isLowercaseVowel || isUppercaseVowel)
        printf("%c is a vowel.", c);
    else
        printf("%c is a consonant.", c);
    return 0;
}
```

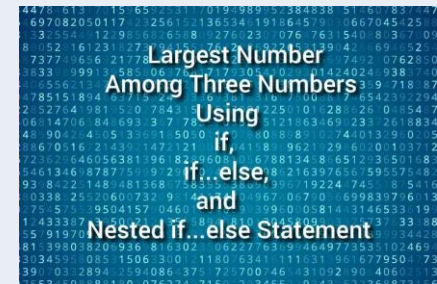
Output

```
Enter an alphabet: G
G is a consonant.
```



➤ C Program to Find the Largest Number Among Three Numbers

➤ In this example, the largest number among three numbers (entered by the user) is found using three different methods. [USING IF]



➤ C

```
#include <stdio.h>
int main()
{
    double n1, n2, n3;

    printf("Enter three numbers: ");
    scanf("%lf %lf %lf", &n1, &n2, &n3);

    if( n1>=n2 && n1>=n3 )
        printf("%.2f is the largest number.", n1);

    if( n2>=n1 && n2>=n3 )
        printf("%.2f is the largest number.", n2);

    if( n3>=n1 && n3>=n2 )
        printf("%.2f is the largest number.", n3);

    return 0;
}
```

➤ C++

```
#include <iostream>
using namespace std;

int main()
{
    float n1, n2, n3;

    cout << "Enter three numbers: ";
    cin >> n1 >> n2 >> n3;

    if(n1 >= n2 && n1 >= n3)
    {
        cout << "Largest number: " << n1;
    }

    if(n2 >= n1 && n2 >= n3)
    {
        cout << "Largest number: " << n2;
    }

    if(n3 >= n1 && n3 >= n2) {
        cout << "Largest number: " << n3;
    }

    return 0;
}
```

```
Enter three numbers: -4.5
3.9
5.6
5.60 is the largest number.
```



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➤ C Program to Find the Largest Number Among Three Numbers

➤ In this example, the largest number among three numbers (entered by the user) is found using three different methods. [USING IF...ELSE]

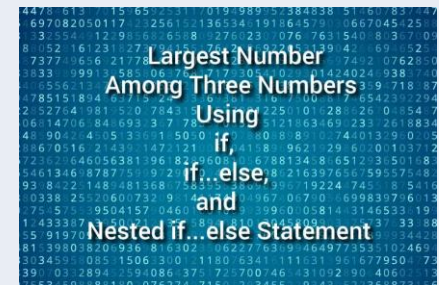
➤ C

```
#include <stdio.h>
int main()
{
    double n1, n2, n3;

    printf("Enter three numbers: ");
    scanf("%lf %lf %lf", &n1, &n2, &n3);

    if (n1>=n2)
    {
        if(n1>=n3)
            printf("%.2lf is the largest number.", n1);
        else
            printf("%.2lf is the largest number.", n3);
    }
    else
    {
        if(n2>=n3)
            printf("%.2lf is the largest number.", n2);
        else
            printf("%.2lf is the largest number.",n3);
    }

    return 0;
}
```



Enter three numbers: -4.5
3.9
5.6
5.60 is the largest number.

➤ C program to Find all Roots of a Quadratic equation

- This program accepts coefficients of a quadratic equation from the user and displays the roots (both real and complex roots depending upon the determinant).

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

int main()
{
    double a, b, c, determinant, root1, root2, realPart, imaginaryPart;

    printf("Enter coefficients a, b and c: ");
    scanf("%lf %lf %lf", &a, &b, &c);

    determinant = b*b-4*a*c;

    // condition for real and different roots
    if (determinant > 0)
    {
        // sqrt() function returns square root
        root1 = (-b+sqrt(determinant))/(2*a);
        root2 = (-b-sqrt(determinant))/(2*a);

        printf("root1 = %.2lf and root2 = %.2lf", root1, root2);
    }

    //condition for real and equal roots
    else if (determinant == 0)
    {
        root1 = root2 = -b/(2*a);

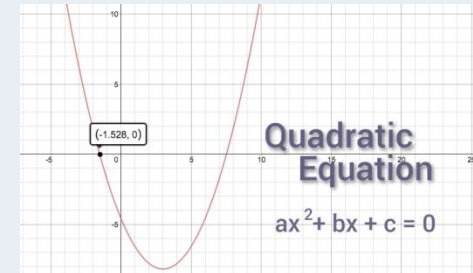
        printf("root1 = root2 = %.2lf", root1);
    }

    // if roots are not real
    else
    {
        realPart = -b/(2*a);
        imaginaryPart = sqrt(-determinant)/(2*a);
        printf("root1 = %.2lf+%.2lfi and root2 = %.2lf-%.2lfi", realPart, imaginaryPart, realPart, imaginaryPart);
    }

    return 0;
}
```

Output

```
Enter coefficients a, b and c: 2.3
4
5.6
Roots are: -0.87+1.30i and -0.87-1.30i
```



If determinant > 0,	$\text{root1} = \frac{-b + \sqrt{(b^2 - 4ac)}}{2a}$
	$\text{root2} = \frac{-b - \sqrt{(b^2 - 4ac)}}{2a}$
If determinant = 0,	$\text{root1} = \text{root2} = \frac{-b}{2a}$
If determinant < 0,	$\text{root1} = \frac{-b}{2a} + i \frac{\sqrt{-(b^2 - 4ac)}}{2a}$
	$\text{root2} = \frac{-b}{2a} - i \frac{\sqrt{-(b^2 - 4ac)}}{2a}$

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➤ C Program to Check Leap Year

- This program checks whether an year (integer) entered by the user is a leap year or not.

```
#include <stdio.h>

int main()
{
    int year;

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

    if(year%4 == 0)
    {
        if( year%100 == 0)
        {
            // year is divisible by 400, hence the year is a leap year
            if ( year%400 == 0)
                printf("%d is a leap year.", year);
            else
                printf("%d is not a leap year.", year);
        }
        else
            printf("%d is a leap year.", year );
    }
    else
        printf("%d is not a leap year.", year);

    return 0;
}
```



Output 1

```
Enter a year: 1900
1900 is not a leap year.
```

Output 2

```
Enter a year: 2012
2012 is a leap year.
```

➤ C Program to Check Whether a Number is Positive or Negative

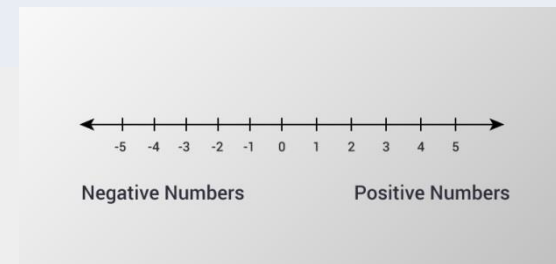
➤ In this example, you will learn to check whether a number (entered by the user) is negative or positive.

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

    printf("Enter an integer: ");
    scanf("%d", &number);

    // True if the number is perfectly divisible by 2
    if(number % 2 == 0)
        printf("%d is even.", number);
    else
        printf("%d is odd.", number);

    return 0;
}
```



Output

```
Enter an integer: -7
-7 is odd.
```




➤ **To do List**

- Start Homework 2
- Explain what is “Nested if...else”. And what is the difference compared with “if...else” (**DUE NEXT SECTION**)
- Create a Program Check if a Number is Positive or Negative Using Nested if...else (**DUE NEXT SECTION**)