



Faculty of Computer Science

Fundamentals of Programming (Fall-2019)

Lab 02 - Variables, Inputs and Operators, If/Else

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Date:

Objective of Lab No. 2:

After performing lab 2, students will be able to:

- Use the comments in their programs
- Use variables, inputs, operators
- Use if/else statement.

Practice Task No. 1 (Using Variables):

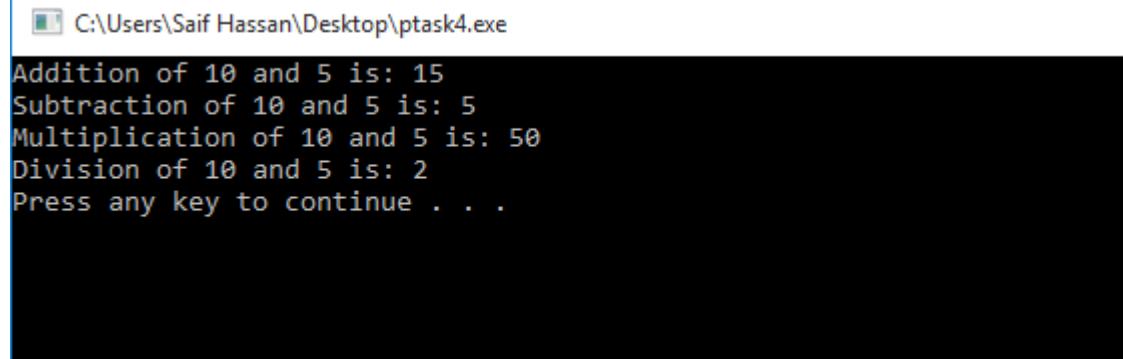
Write a program to perform arithmetic operations using three integer variables num1, num2 and result.

Solution:

```
1. #include <iostream>
2. using namespace std ;
3. int main ()
4. {
5.
6.     int num1, num2; // Declaring Variables
7.     int result = 0; // Declare and initialize
8.
9.     num1 = 10; // assigning value to num1
10.    num2 = 5; // assigning value to num1
11.
12.    result = num1 + num2; // adding two numbers
13.
14.    cout<<"Addition of "<<num1<< " and "<<num2<<" is: "<<result;
15.    cout<<endl;
16.
17.    result = num1 - num2; // Subtracting two numbers
18.    cout<<"Subtraction of "<<num1<< " and "<<num2<<" is: "<<result;
19.    cout<<endl;
20.
21.    result = num1 * num2; // Multiplying two numbers
22.    cout<<"Multiplication of "<<num1<< " and "<<num2<<" is: "<<result;
23.    cout<<endl;
24.
```

```
25.     result = num1 / num2; // Division of two numbers
26.     cout<<"Division of "<<num1<<" and "<<num2<<" is: "<<result;
27.     cout<<endl;
28.
29.     system ("PAUSE") ;
30.     return 0 ;
31. }
```

Output:



```
C:\Users\Saif Hassan\Desktop\ptask4.exe
Addition of 10 and 5 is: 15
Subtraction of 10 and 5 is: 5
Multiplication of 10 and 5 is: 50
Division of 10 and 5 is: 2
Press any key to continue . . .
```

Practice Task 2 (Input from User):

Write and run a program that reads two integers through the keyboard and performs simple arithmetic operations (i.e., addition, subtraction, multiplication and division) and displays the results.

Solution:

```
1. #include <iostream>
2. using namespace std ;
3. int main ()
4. {
5.
6.     int num1, num2; // Declaring Variables
7.     int result = 0; // Declare and initialize
8.
9.     cout<<"Enter number1: ";
10.    cin>>num1; // taking input num1 from user
11.    cout<<"Enter number2: ";
12.    cin>>num2; // taking input num2 from user
13.
14.    result = num1 + num2; // adding two numbers
15.
16.    cout<<"Addition of "<<num1<<" and "<<num2<<" is: "<<result;
17.    cout<<endl;
18.
19.    result = num1 - num2; // Subtracting two numbers
20.    cout<<"Subtraction of "<<num1<<" and "<<num2<<" is: "<<result;
21.    cout<<endl;
22.
```

```

23.     result = num1 * num2; // Multiplying two numbers
24.     cout<<"Multiplication of "<<num1<<" and "<<num2<<" is: "<<result;
25.     cout<<endl;
26.
27.     result = num1 / num2; // Division of two numbers
28.     cout<<"Division of "<<num1<<" and "<<num2<<" is: "<<result;
29.     cout<<endl;
30.
31.     system ("PAUSE") ;
32.     return 0 ;
33. }
```

Practice Task 3 (If/Else):

Write a program to ask two numbers, sum both numbers and check whether the sum is greater than 50 or not.

Solution:

```

1. #include <iostream>
2. using namespace std ;
3. int main ()
4. {
5.
6.     int num1, num2; // Declaring Variables
7.     int result = 0; // Declare and initialize
8.
9.     cout<<"Enter number1: ";
10.    cin>>num1; // taking input num1 from user
11.    cout<<"Enter number2: ";
12.    cin>>num2; // taking input num2 from user
13.
14.    result = num1 + num2; // adding two numbers
15.
16.    if (result > 50)
17.    {
18.        cout<<"Sum is greater than 50 and sum is: "<< result;
19.    }
20.    else
21.    {
22.        cout<<"Sum is not greater than 50 and sum is"<< result;
23.    }
24.
25.    system ("PAUSE") ;
26.    return 0 ;
27. }
```

Practice Task 4 (If / Else if / Else)

Write a program to ask student's marks and output grade. Following is criteria:

Marks	Grade
90-100	A1
80-90	A
70-80	B
60-70	C
Less than 60	F

Solution:

```
1. #include <iostream>
2. using namespace std ;
3. int main ()
4. {
5.
6.     int marks;// Declaring Variables
7.
8.     cout<<"Enter students marks: ";
9.     cin>>marks; // taking input marks from user
10.
11.    if (marks > 90)
12.    {
13.        cout<<"A1 Grade";
14.    }
15.    else if (marks > 80)
16.    {
17.        cout<<"A Grade";
18.    }
19.    else if (marks > 70)
20.    {
21.        cout<<"B Grade";
22.    }
23.    else if (marks > 60)
24.    {
25.        cout<<"C Grade";
26.    }
27.    else
28.    {
29.        cout<<"F Grade";
30.    }
31.    cout<<endl;
32.
33.    system ("PAUSE") ;
34.    return 0 ;
```

| 35. }

Exercises

Question 1:

Write and run a program that performs the following steps:

- Create variable pi and radius r of related data type.
- Assign values to above variables.
- Calculating the circumference using the formula: $C = 2\pi r$.
- Displaying the circumference C.

Question 2:

Write and run a program that performs the following steps:

- Create variable f of related data type.
- Assign values to above variables.
- Calculating the equivalent Celsius temperature C using the formula:

$$C = \frac{5}{9}(f - 32).$$

- Displaying the Celsius temperature C.

Question 3:

Write a program to take *initialVelocity* and *acceleration* from user, save them in respective data types and calculate FINAL VELOCITY as per following formula:

$$\text{FINAL VELOCITY} = \text{initialVelocity} + \text{acceleration}$$

Question 4:

Take *distance* and *time* from user, save them in respective data types and calculate SPEED as per following formula:

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

Question 5:

Take *mass* and *velocity* from user, save them in respective data types and calculate KINETIC ENERGY as per following formula:

$$\text{KINETIC ENERGY} = \frac{1}{2} \cdot \text{mass} \cdot \text{velocity}^2$$

Question 6:

Write a program that will ask UNIT PRICE of *chocolate*, *ice-cream* and *french-fries*. Then your program will ask about (QUANTITY) how many *chocolate*, *ice-cream* and *french-fries* you have to buy. In the end, you have to print the TOTAL BILL by simply multiplying UNIT PRICE of *chocolate* with QUANTITY of *chocolate* and so on and so forth.

$$Total\ Bill = \sum_i^n QTY_i \cdot Price_i$$

Question 7:

Make a program where it is asked from user to enter total amount, you have to answer how much ZAKAT to be paid on that amount. ZAKAT is the 2.5% of the total amount.

Question 8:

Write and run a program that reads an angle (expressed in degrees) and states in which quadrant the given angle lies. An angle A is said to be in the

- First quadrant if it is in the range $0 \leq A < 90$
- second quadrant if it is in the range $90 \leq A < 180$
- third quadrant if it is in the range $180 \leq A < 270$
- and fourth quadrant if it is in the range $270 \leq A < 360$