National University of Computer and Emerging Sciences

Laboratory Manual

for

Programming Fundamentals

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Lab Manual 02

Introduction

Objectives

In this lab we will mainly perform three types of activities

1. Identify the purpose of a given pseudocode.
2. Convert a given pseudocode to a C++ program and then compile/run it using anVisual Studio IDE 2012.
3. For a given problem, create a pseudocode to solve it and then convert it into C++ code.

The programs considered in this lab will only involve the following notions

1. Declare variables and use a variable to store a value and access it later.
2. Write arithmetic and logical expression involving variables and constants.
3. Control precedence of operations of an expression using parenthesis.
4. Input / Output of values.
5. Use IF-THEN ELSE to attain conditional execution of instructions.

Basic Knowledge for the activity:

Arithmetic Operators (+ , -, /, %, *, =)

Relational Operators (< , > , =)

Logical Operators (and (&&), or (||), not (!))

Data Types

IF-Then-ELSE

Example1 (Warm up)

Activity # 1(Calculate area of Rectangle)

Take two inputs from user (keyboard) length and breadth of rectangle. Compute the area of rectangle given by: area = length*breadth

Step-1: Create a console application.	**Open Visual studio and create a console application**
Step-2: Declareintvariables length, breath and area.	int length; int breadth; int area;
Step-3: Print a message for user to input length.	cout<<"Please enter length of rectangle: ";
Step-4: Take input from user/keyboard length.	cin>> length;
Step-5: Print a message for user to input breadth.	cout<<"Please enter breadth of rectangle: ";
Step-6: Take input from user/keyboard breadth.	cin>> breadth;

Problems (arithmetic operators)

1. Write a code to calculate the area of triangle, your code must ask the user to enter base and hypotenuse and then display the result on the Console window.

2. Compute Area of a circle using its radius. Formula for calculating area of a circle is πr2.
3. Calculate the total amount present in an ATM machine using the count of 5000, 1000, 500and 100 rupees note available in the machine Take the input from user for numbers of note of 5000, 1000, 500 and 100 rupees.
4. Take marks of 5 subjects separately from the user. Calculate the percentage of total marks and print it.
5. Write a C++ program that takes two integers as input, store these in two different variables and then swap the values of these two variables.
   Input: a=5 b=10
   Output: a=10 b=5

Example 2:

Read a number from the user, test whether it is even or odd and then display accordingly.

```
#include <iostream>
using namespace std;
int main()
{
   int number;
cout<< "Enter an integer: ";
cin>> number;
   if ( number % 2 == 0)
cout<< number<< " is even.";
   else
cout<< number<< " is odd.";
   return 0;
}
```

Problems (use of if statement)

1. Read two numbers and print the numbers in ascending order.
2. Read three numbers print largest number. (**use relational and logical operators**)
3. Read a test score of a student (integer value in the range 0-100), determine if the score is passing (50 or more) and then display accordingly (fail if the score is below 50; pass otherwise).
4. Write C++ code that performs the following: Ask a user to enter a number. If the number is: In the range 1 and 5, write the word **blue** . If the number is in the range 6 and 10, write the word **red**. If the number is between 11 and 15, write the word **green**.
5. Read marks of 5 subjects and calculate average, assign grade according to average(**mix operators**)
   a) If average is greater than 80 assign grade A
   b) If average less than 80 and greater than 70 assign grade B
   c) If average less than 70 and greater than 60 assign grade C
   d) If average less than 60 and greater than 50 assign grade D
   e) If average less than 50 assign grade F

Example 3: (Precedence)

Note: (Solve the equations given in the following code manually before you run the code)

```
int main()
{
   int a  = 10 , b = 20, c = 22;
   double d = 10.5;
   double A , B, C;
  A =  a -b +c/2;
        cout<<A << endl;
   B = a+b*c/2
         cout<<B << endl;
   C  = a*b+(c+d)/2
          cout<<C << endl;
   return 0;
}
```

Problems:

1. Write a program to solve the following equation

int a = 20, b = 10, c = 15, d = 5;

int e;

e = (a + b) * c / d;

e = ((a + b) * c) / d;

e = (a + b) * (c / d);

e = a + (b * c) / d

Now remove the parenthesis and show the results are different