**Assignment number: 3**

**Subject: Object Oriented Programming**

**CALCULATOR**

Name: ***RIA MITTAL***

Class: ***SECOND YEAR ENGINEERING***

Division: ***B***

Roll no: ***222008***

Batch: ***B1***

**Problem Statement:**

Write a C++ program create a calculator for an arithmetic operator (+, ­, \*, /). The program should take two operands from user and performs the operation on those two operands depending upon the operator entered by user. Use a switch statement to select the operation. Finally, display the result. Some sample interaction with the program might look like this:

Enter first number, operator, second number: 10 / 3

Answer = 3.333333

Do another (y/n)? y

Enter first number, operator, second number: 12 + 100

Answer = 112

Do another (y/n)? n

# Objective :

## **Assume appropriate data members and member function to accept required data & print data .**

# CONCEPT:

Switch case,classes and objects, Do While

# THEORY:

**Switch-case**

A switch statement allows a variable to be tested for equality against a list of values. Each value is called a case, and the variable being switched on is checked for each case.

The default case isn't always required and isn't compulsory.

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**Syntax:**

The syntax for a switch statement in C++ is as follows:

switch(expression){

case constant-expression :

statement(s);

break;

case constant-expression :

statement(s);

break;

default :

statement(s);

}

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**Example:**

#include <iostream>

using namespace std;

int main ()

{

string week = “A”;

switch(week)

{

case 'A' :

cout << "Monday!" << endl;

break;

case 'B' :

cout << "Tuesday!" << endl;

break;

case 'C' :

cout << "Wednesday!" << endl;

break;

case 'D' :

cout << "Thursday!" << endl;

break;

case 'F' :

cout << "Friday!" << endl;

break;

case 'G' :

cout << "Saturday!" << endl;

break;

default:

cout<<”Invalid entry”;

}

**Do-while:**

Unlike for and while loops, which test the loop condition at the top of the loop, the do-while loop checks its condition at the bottom of the loop.A do-while loop is similar to a while loop, except that a do-while loop is guaranteed to execute at least one time.

**Syntax:**

The syntax of a do-while loop in C++ is:

do

{

statement(s);

}while( condition );

**Example:**

#include <iostream>

using namespace std;

int main ()

{

// Local variable declaration:

int a = 10;

// do loop execution

do

{

cout << "value of a: " << a << endl;

a = a + 1;

}while( a < 20 );

return 0;

}

**Class and objects:**

When you define a class, you define a blueprint for a data type. This doesn't actually define any data, but it does define what the class name means, that is, what an object of the class will consist of and what operations can be performed on such an object.

A class definition starts with the keyword class followed by the class name; and the class body, enclosed by a pair of curly braces. A class definition must be followed either by a semicolon or a list of declarations. For example, we defined the Box data type using the keyword class as follows:

class Box

{

public:

double length; // Length of a box

double breadth; // Breadth of a box

double height; // Height of a box

};

A class provides the blueprints for objects, so basically an object is created from a class. We declare objects of a class with exactly the same sort of declaration that we declare variables of basic types. Following statements declare two objects of class Box:

Box Box1; // Declare Box1 of type Box

Box Box2; // Declare Box2 of type Box

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**ALGORITHM**

1. START
2. Take two numbers from user a1 and a2.
3. Take a choice variable (choice) from the user.
4. If choice=1 add the numbers
5. If choice=2 subtract a1 from a2.
6. If choice=3multiply the numbers.
7. If choice=4 divide a1 by a2.
8. Display result.
9. Ask user if he want to repeat (y/n).

10. If yes then go step 2.

11. END

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**STATE TRANSITION DIAGRAM**

Q0 – Initialization and accepting values

Q1 – Run do-while loop and perform one of the operations

Q2 – Perform addition

Q3 – Perform subtraction

Q4 – Perform multiplication

Q5 – Perform division

Q6 – Display result and ask for new inputs

Qe – End state.

# PROGRAM:

#include<iostream>

using namespace std;

class calculator

{

float a,b,result;

public:

void getdata(int x,int y)

{

a=x;

b=y;

}

void add()

{

result=a+b;

cout<<"\nAddition : "<<result;

}

void sub()

{

result=a-b;

cout<<"\nSubtraction : "<<result;

}

void mul()

{

result=a\*b;

cout<<"\nMultiplication : "<<result;

}

void div()

{

if(b==0)

cout<<"\nThe Answer Is Not Defined (As b=0)";

else

{

result=a/b;

cout<<"\nDivision : "<<result;

}

}

};

int main()

{

calculator obj;

int a1,a2,i,choice;

char ch;

do

{

cout<<"\nEnter Two Numbers : ";

cin>>a1>>a2;

obj.getdata(a1,a2);

cout<<"\n\_\_\_\_\_\_--MENU--\_\_\_\_\_\_";

cout<<"\n1.Addition";

cout<<"\n2.Subtraction";

cout<<"\n3.Multiplication";

cout<<"\n4.Division";

cout<<"\n\nEnter Your Choice : ";

cin>>choice;

switch(choice)

{

case 1:

{

obj.add();

break;

}

case 2:

{

obj.sub();

break;

}

case 3:

{

obj.mul();

break;

}

case 4:

{

obj.div();

break;

}

default:cout<<"\nWrong Choice";

}

cout<<"\n\nDo You Want To Execute The Program Again (Yes=Y) OR (No=N) : ";

cin>>ch;

}

while(ch=='y'||ch=='Y');

cout<<"\n\n\n\nThank You";

return 0; }

**OUTPUT:**

Enter Two Numbers:

4

6

\_\_\_\_\_\_--MENU--\_\_\_\_\_\_

1 .Addition

2. Subtraction

3. Multiplication

4. Division

Enter Your Choice: 1

Addition : 10

Do You Want To Execute The Program Again (Yes=Y) OR (No=N): Y

Enter Two Numbers:

5

8

\_\_\_\_\_\_--MENU--\_\_\_\_\_\_

1 .Addition

2. Subtraction

3. Multiplication

4. Division

Enter Your Choice: 3

Multiplication: 40

Do You Want To Execute The Program Again (Yes=Y) OR (No=N) : N

Thank You

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# CONCLUSION:

Through this program we understand the implementation of classes, their objects, implementation of function and function calling, and the use of switch-case as a conditional statement in place of if-else-if compound statement.

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