Mini Project

on

Menu Driven Arithmetic Operations

(Add, Subtract, Divide, Multiply)

Group No. 1

(TE COMP A)

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for the subject

Micro Processor

In

T.E. COMPUTER ENGINEERING

(Academic Year: 2022-23)

Tools Used:

Turbo C++

Programming Language:

- C Language
- Assembly Language Instructions

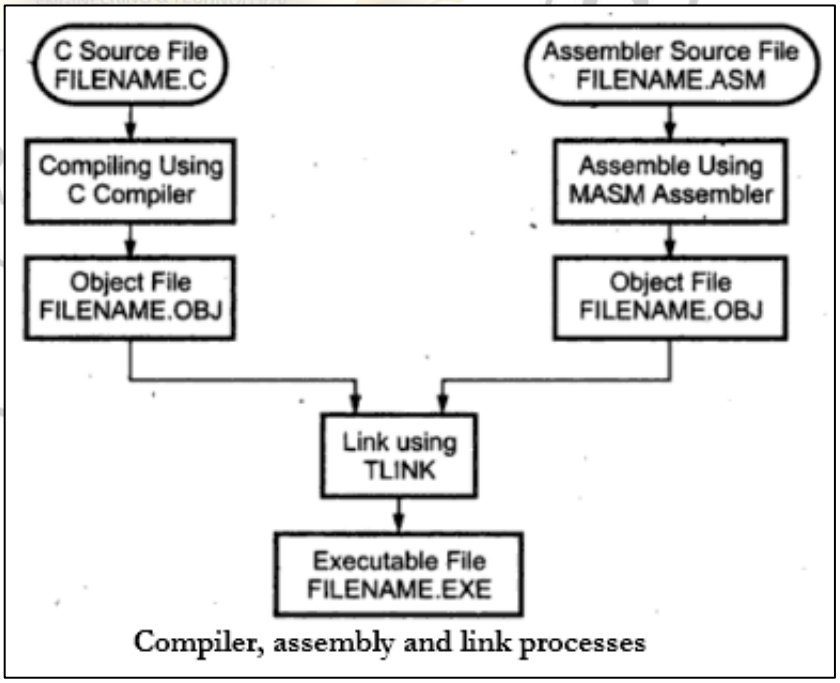
Methodology Used:

Mixed Mode Programming concept was used to implement a Menu Driven Calculator to perform basic Arithmetic Operations such as Addition, Subtraction, Division, Multiplication.

Mixed-language programming always involves a call to a function, procedure, or subroutine. Mixed-language calls involve calling functions in separate modules. Instead of compiling all source programs with same compiler, different compilers or assemblers are used as per the language used in the programs.

Microsoft C supports this mixed language programming. So, it can combine assembly code routines in C as a separate language.

C program calls assembly language routines that are separately assembled by-MASM (MASM Assembler). These assembled modules are linked with the compiled C modules to get executable file. Fig shows the compile, assemble and link processes using C compiler, MASM assembler, and TUNIC.



Compiler, assembly and link processes

Steps to perform mixed mode programming:

1. Assembly Language can be Written in C.
2. C Supports Assembly as well as Higher Language Features so called "Middle Level Language".
3. "asm" Keyword is written to indicate that "next followed instruction is from Assembly Language".
4. Opening Curly brace after "asm" keyword tells that it is the "Start of Multiple Line Assembly Statements" i.e. "We want to Write Multiple Instructions"
5. Above Program Without "Opening and Closing Brace" can be written as – ["asm" keyword before every Instruction]

Features of Calculator:

1) Addition of two numbers
2) Subtraction of two numbers
3) Multiplication of two numbers
4) Division of two numbers
5) Reset feature
6) Exit

Code:

```
#include <iostream.h>
#include <conio.h>
void main()
{
        clrscr();
        int a,b,result;
        int ch;
        cout<<"--------------------CALCULATOR----------------\n";
        cout<<"\nEnter first number : ";
        cin>>a;
        cout<<"\nEnter second number : ";
        cin>>b;
        cout<<"---------------------------------------\n";
        do
        {
                cout<<"\n1.Addition \n2.Subtraction \n3.Multiplication \n4.Division \n5.Reset
\n6.Exit"<<endl;
                cout<<"---------------------------------------\n";
                cout<<"Enter your choice : ";
                cin>>ch;

                switch(ch)
                {
                        case 1:
                        {
                                asm mov ax,a;
                                asm mov bx,b;
                                asm add ax,bx;
                                asm mov result,ax;
                                cout<<"---------------------------------------\n";
                                cout<<"Addition of "<<a<<" and "<<b<<" = "<<result<<endl;
                                cout<<"---------------------------------------\n";
                                break;
                        }
                        case 2:
                        {
                                asm mov ax,a;
                                asm mov bx,b;
                                asm sub ax,bx;
                                asm mov result,ax;
                                cout<<"---------------------------------------\n";
                                cout<<"Subtraction of "<<a<<" and "<<b<<" = "<<result<<endl;
                                cout<<"---------------------------------------\n";
                                break;
                        }
                        case 3:
                        {
```

```
                        asm mov ax,a;
                        asm mov bx,b;
                        asm mul bx;
                        asm mov result,ax;
                        cout<<"---------------------------------------\n";
                        cout<<"Multiplication of "<<a<<" and "<<b<<" = "<<result<<endl;
                        cout<<"---------------------------------------\n";
                        break;
                }
                case 4:
                {
                        asm mov ax,a;
                        asm mov bx,b;
                        asm div bx;
                        asm mov result,ax;
                        cout<<"---------------------------------------\n";
                        cout<<"Division of "<<a<<" by "<<b<<" = "<<result<<endl;
                        cout<<"---------------------------------------\n";
                        break;
                }
                case 5:
                {
                        cout<<"---------------------------------------\n";
                        cout<<"\nEnter first number : ";
                        cin>>a;
                        cout<<"\nEnter second number : ";
                        cin>>b;
                        cout<<"\n---------------------------------------\n";
                        break;
                }
                case 6:
                {
                        break;
                }
                default:
                {
                        cout<<"\n---------------------------------------\n";
                        cout<<"Wrong Input";
                        cout<<"\n---------------------------------------\n";
                        break;
                }
        }
    }while(ch!=6);
    getch();
}
```

```
----------CALCULATOR----------

Enter first number : 22

Enter second number : 18
----------------------------------------

1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Reset
6.Exit
----------------------------------------
Enter your choice : 1
        _
 ----------------------------------------
 Addition of 22 and 18 = 40
 ----------------------------------------

 1.Addition
 2.Subtraction
 3.Multiplication
 4.Division
 5.Reset
 6.Exit
 ----------------------------------------
 Enter your choice : 2
 ----------------------------------------
 Subtraction of 22 and 18 = 4
 ----------------------------------------

 1.Addition
 2.Subtraction
 3.Multiplication
 4.Division
 5.Reset
 6.Exit
 ----------------------------------------
```

```
Enter your choice : 3
----------------------------------------
Multiplication of 22 and 18 = 396
----------------------------------------

1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Reset
6.Exit
----------------------------------------
Enter your choice : 4
----------------------------------------
Division of 22 by 18 = 1
----------------------------------------

1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Reset
6.Exit
----------------------------------------
Enter your choice : 5
----------------------------------------

Enter first number : 25

Enter second number : 36

----------------------------------------
```

```
----------------------------------------

1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Reset
6.Exit
----------------------------------------
Enter your choice : 6_
```

Conclusion:

The implementation of Calculator using Mixed Mode Programming concept where Assembly Language Instructions were embedded into CPP programming language. The code was efficient enough to reset the operators and to perform all the arithmetic operations.

For Faculty Use

Correction Parameters	Formative Assessment [40%]	Timely completion of Practical [40%]	Attendance/ Learning Attitude [20%]	
Marks Obtained				