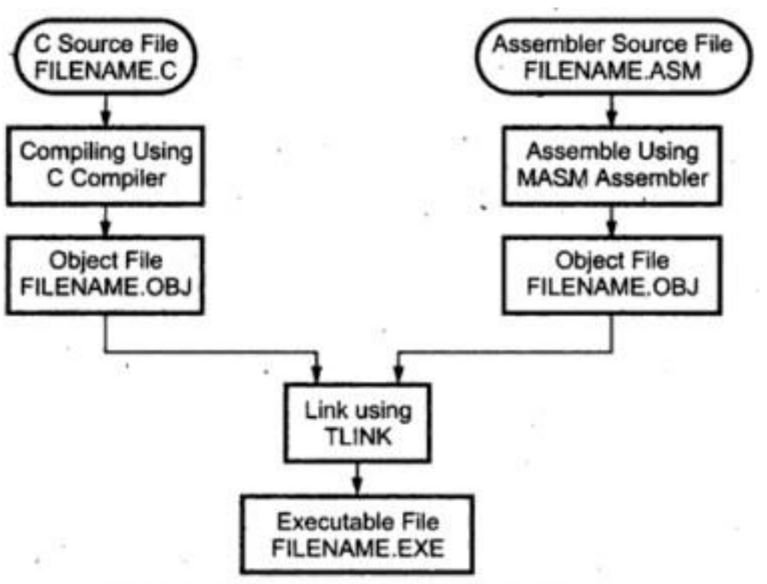
Experiment 08: Mixed Mode Programming

Learning Objective: Studentshouldbeableto Writeamixedlanguagecode forshiftthegiven number n number of times to the left and right.

Tools: TASM/MASM/ Turbo C/C++

Theory:

1. There are times when programs need to call programs written in other languages referredas mixed language programming. For example, when a particular subprogram is availablein a language other than language you are using, or when algorithms are described morenaturally in a different language, you need to use more than one language.
2. Mixed-language programming always involves a call to a function, procedure, orsubroutine. Mixed-language calls involve calling functions in separate modules. Insteadof compiling all source programs with same compiler, different compilers or assemblersare used as per the language used in the programs.
3. Microsoft C supports this mixed language programming. So it can combine assemblycode routines in C as a separate language.
4. C program calls assembly language routines that are separately assembled by-MASM(MASM Assembler). These assembled modules are linked with the compiled C modulesto get executable file. Fig shows the compile, assemble and link processes using Ccompiler, MASM assembler, and TUNIC.



Compiler, assembly and link processes

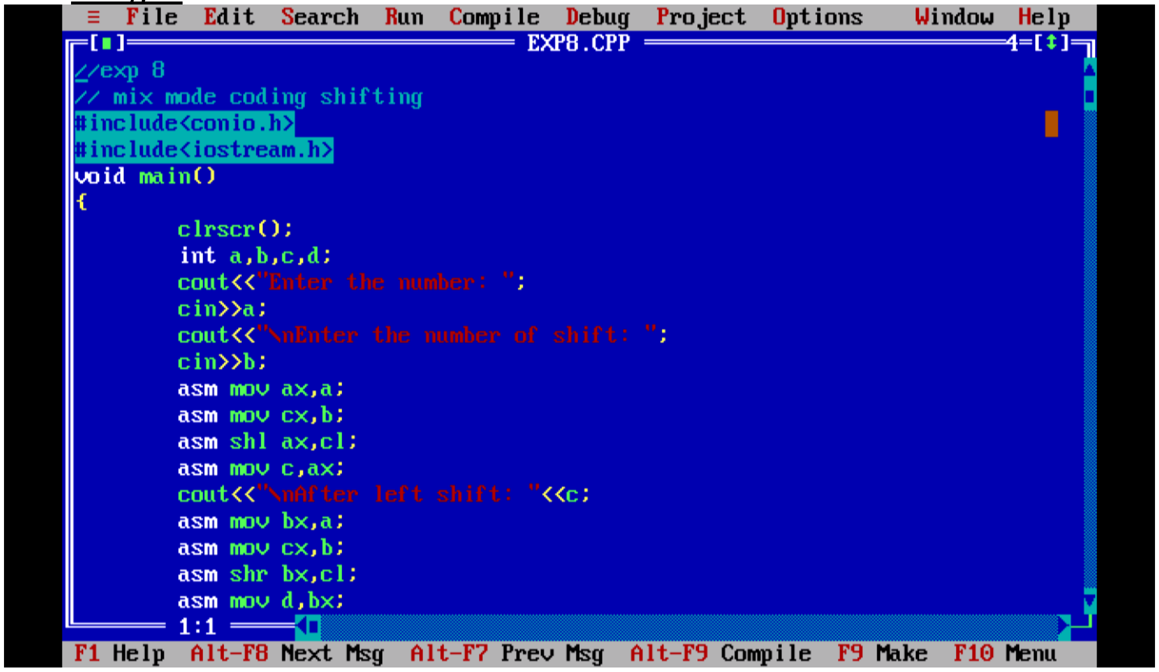
```
#include<stdio.h>

void main() {

  int a = 3, b = 3, c;

  asm {
    mov
    ax,amov
    bx,aadd
    ax,bxmo
    v c,ax
  }

  printf("%d",c);
}
```

1. **Assembly Language**can be Written in C .

2. CSupportsAssemblyaswellas **<u>HigherLanguageFeatures</u>**socalled **<u>“MiddleLevelLanguage”</u>**.
3. AsshowninaboveProgram, **<u>“asm”</u>**Keywordiswrittentoindicatethat **<u>“nextfollowedinstruction is from Assembly Language”</u>**.
4. **<u>OpeningCurlybrace</u>**after“asm”keywordtellsthatitisthe **<u>“StartofMultipleLineAssembly Statements”</u>**i.e “We want to Write Multiple Instructions”
5. AboveProgramWithout“OpeningandClosingBrace”canbewrittenas–[“asm”keyword before every Instruction]

Application: Use of mixed mode programmingto write modular program.

<u>Design:</u>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EXP8.CPP
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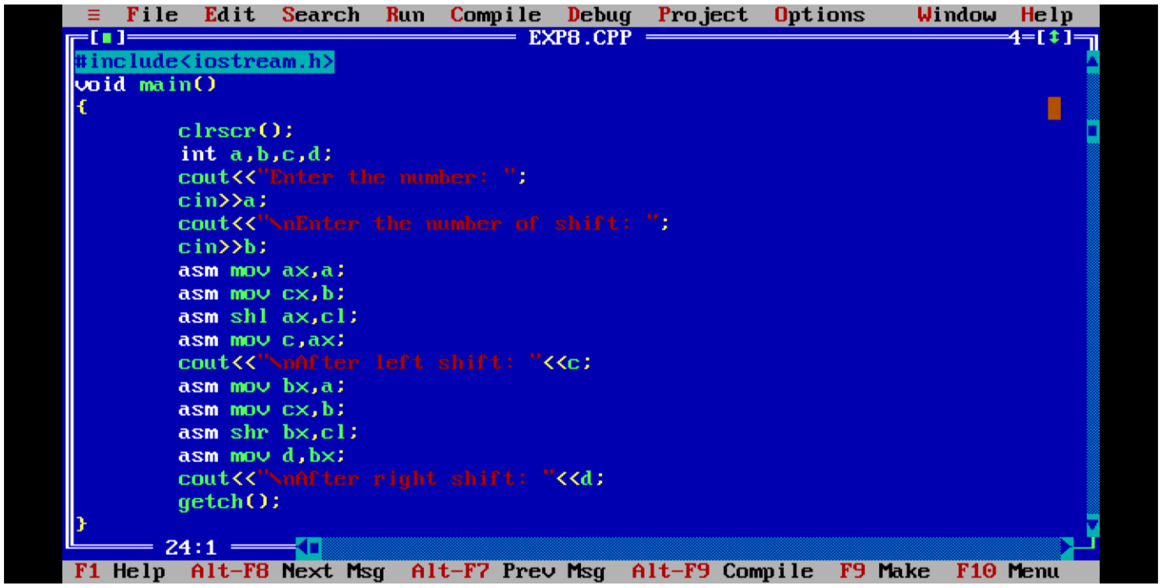
F1 Help Alt-F8 Next Msg Alt-F7 Prev Msg Alt-F9 Compile F9 Make F10 Menu

```
//exp 8
// mix mode coding shifting
#include<conio.h>
#include<iostream.h>
void main()
{
        clrscr();
        int a,b,c,d;
        cout<<"Enter the number: ";
        cin>>a;
        cout<<"\nEnter the number of shift: ";
        cin>>b;
        asm mov ax,a;
        asm mov cx,b;
        asm shl ax,cl;
        asm mov c,ax;
        cout<<"\nAfter left shift: "<<c;
        asm mov bx,a;
        asm mov cx,b;
        asm shr bx,cl;
        asm mov d,bx;
```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EXP8.CPP
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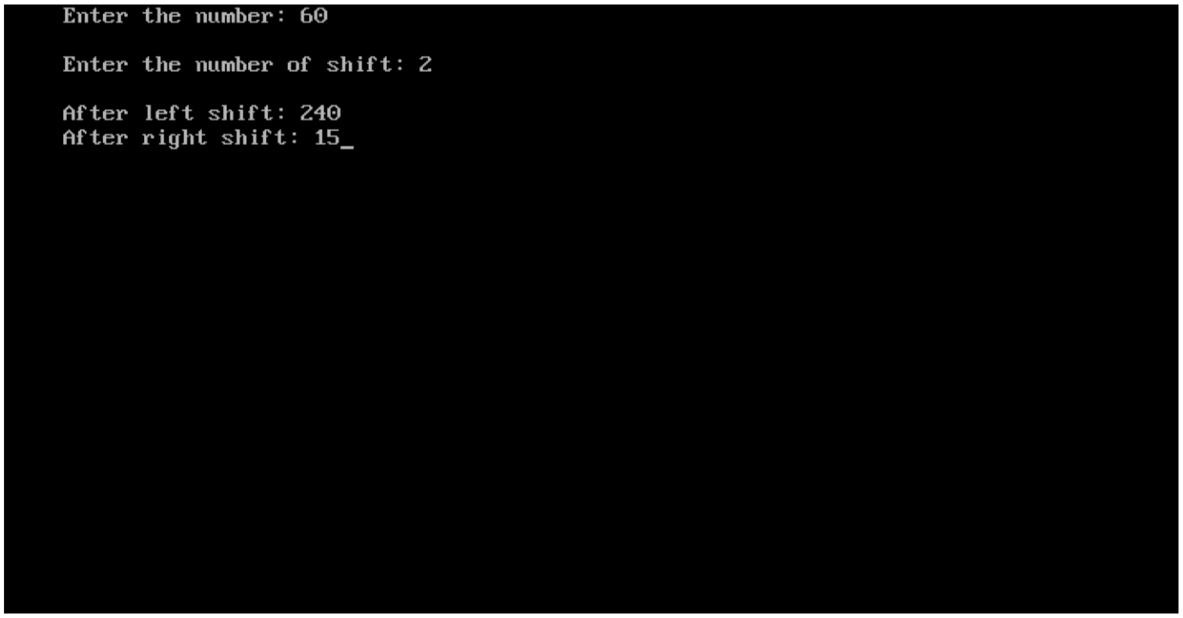
```
#include<iostream.h>
void main()
{
        clrscr();
        int a,b,c,d;
        cout<<"Enter the number: ";
        cin>>a;
        cout<<"\nEnter the number of shift: ";
        cin>>b;
        asm mov ax,a;
        asm mov cx,b;
        asm shl ax,cl;
        asm mov c,ax;
        cout<<"\nAfter left shift: "<<c;
        asm mov bx,a;
        asm mov cx,b;
        asm shr bx,cl;
        asm mov d,bx;
        cout<<"\nAfter right shift: "<<d;
        getch();
}
```

Result and Discussion:



```
Enter the number: 60

Enter the number of shift: 2

After left shift: 240
After right shift: 15_
```

Learning Outcomes: The student should have the ability to

LO1:To develop the understanding of Mixed mode programming.LO2:DeveloptheprograminmixedlanguageforIntel8086processor.
LO3: Demonstrate the execution and debugging of mixed language program.

CourseOutcomes:Uponcompletionofthecoursestudentswillbeabletomakeuseofinstructions of 8086 to build assembly and Mixed language programs.

Conclusion:

In this experiment, mixed mode was understood and instruction was used to built the assembly.

Viva Questions:

1.Write short not on mixed mode programming.

For Faculty Use

Correction Parameters	**Formative Assessment [40%]**	**Timely completionofPractical[40%]**	**Attendance /Learning Attitude [20%]**	
MarksObtained				