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Experiment 6

AIM: To study interfacing between C program and assembly language program.

1. Write a C program to convert Celsius to Fahrenheit where the functions "C2F" is assembly language function. Print the converted temperature in Fahrenheit from the C program.

Rules for Operands:

1. You have to initialize the Celsius_temperature variable with your roll no. E.g. IT020 so, tempc=20 (decimal number).

2. Your output screenshot should contain. (Look at the output screenshot)
   "Name: ……."
   "Roll_no:……."
   "C2f is defined in Assembly Program"
   "Temperature in Celsius……and temperature in Fahrenheit……."

Write your code here:

1. **C-program File (c2f.c)**

```
int tempc=81,tempf;
extern int c2f(int c);
void main()
{
clrscr();
printf("Name       : Aanandi Pankhania\n");
printf("Roll_no    : IT 081\n");
printf("C2f is defined in Assembly Program.\n");
tempf=c2f(tempc);
printf("Celsius    : %d\nFahrenheit  : %d \n",tempc,tempf);
getch();
}
```

2. **Assembly program File (c2f.asm)**

```
 _TEXT SEGMENT BYTE PUBLIC 'CODE'

DGROUP group _DATA, _BSS

        assume cs:_TEXT, ds:DGROUP, SS: DGROUP

_TEXT ends
```

```
_DATA segment word public 'DATA'
_DATA ends

_TEXT segment byte public 'CODE'
PUBLIC _c2f
_c2f PROC NEAR
        PUSH BP
        MOV BP,SP
        PUSH SI
        MOV AX, WORD PTR [BP + 4]
        MOV DX,9
        MUL DX
        MOV BX,5
        CWD
        IDIV BX
        MOV SI,AX
        ADD SI,32
        MOV AX,SI
        POP SI
        POP BP
        RET
_c2f ENDP
_TEXT ENDS

_BSS segment word public 'BSS'
EXTRN _tempf:WORD
```

```
_BSS ends

_DATA segment word public 'DATA'
EXTRN _tempc:WORD
_DATA ends
END
```

Compilation /Running and Debugging steps:

- Clearly mention each step. (For reference use my ppt or you can refer Experiment-6 from the lab manual)

1. Create c2f.c file using TurboC++ and importing c2f1() from asm file.

Compiling file until no error in file.

2. Create c2f1.asm file using Notepad++ and write code for c2f1() which

is used in c file.

3. After creating asm module run following command in DOSBox after mounting

the drive where tasm folder is stored and create obj file

>tasm c2f1.asm

4. Move the c2f1.obj file from tasm folder to TurboC3\bin.

5. Launch TurboC++ and Go to the project menu and select open project.

6. When dialog box appears, type c1.prj.

7. Use the add item option in project menu and add c2f.c and c2f1.obj file.

After this press done option of dialog box.

8. Go to the option menu and select linker. In this menu go to the case sensitive

link and press enter key to turn it off to avoid Upper/lower case disagreements

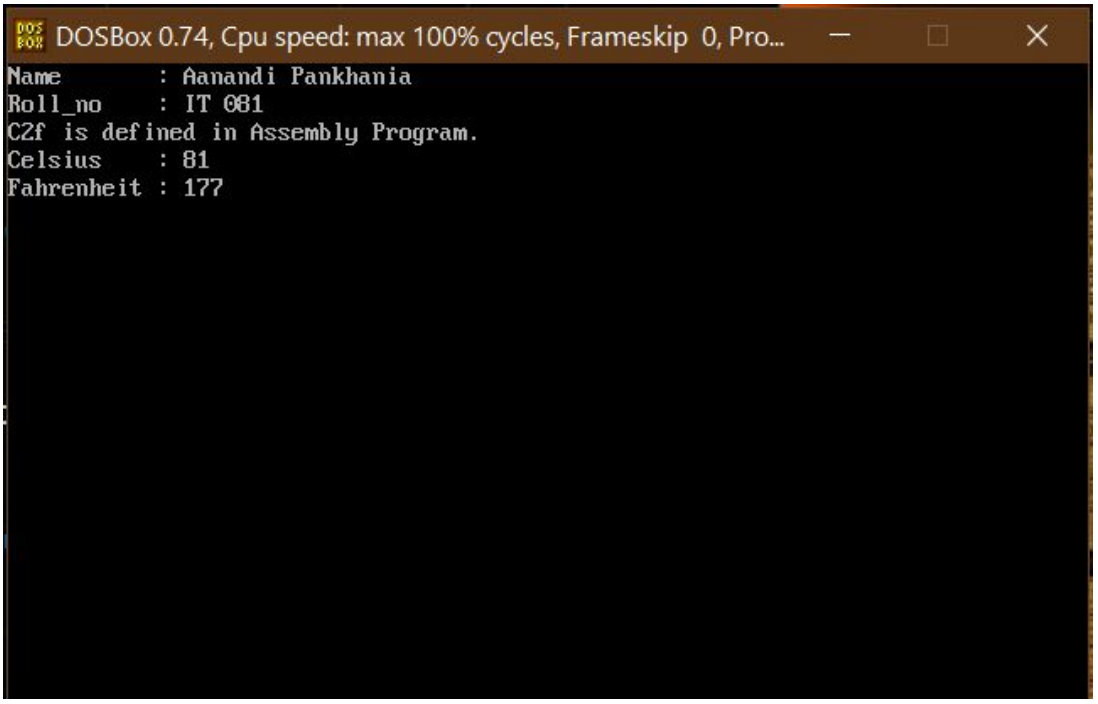
between asm and c file.

9. Go to compile menu, select build all and press enter key to combine c and asm

file and converted into obj file.

10.Go to run menu and select run to run the project.

Output: Screenshot of output. (Fonts should be clearly visible for your output.)



2. Write a C program to convert Celsius to Fahrenheit where the functions "C2F" and "Show" are assembly language functions. (Note: Name, Roll, and message you can print directly from C program but to display converted temperature define show() function in assembly language.)

Rules for Operands:

1. You have to initialize the Celsius_temperature variable with your roll no. E.g. IT020 so, tempc=20 (decimal number).
2. Your output screenshot should contain. (Look at the output screenshot)
   (You can directly write printf statements in C.)
   "Name:……"
   "Roll_no:……."
   "Both functions c2f and show are defined in Assembly Program"
   (Below msg should be printed from Assembly program Show() method.)
   "Temperature in Celsius……and temperature in Fahrenheit……."

Write your code here:

1. C-program File (c2fshow.c)

```
int tempc=81,tempf;
extern int c2f(int c);
extern int show(void);

void main()
```

```
{
    printf("Name       : Aanandi Pankhania\n");
    printf("Roll_no    : IT 081\n");

    printf("Both function C2F and Show are defined in Assembly program \n");
    tempf=c2f(tempc);
    show();
}
```

2. Assembly program File (c2fshow.asm)

```
 _TEXT segment byte public 'CODE'

    DGROUP group _DATA, _BSS

    assume cs:_TEXT, ds:DGROUP, SS: DGROUP

_TEXT ends


_DATA segment word public 'DATA'

    s@ db 'Celsius: %d Fahrenheit=%d' ; PRINTF STRING

_DATA ends

_TEXT segment byte public 'CODE'

    PUBLIC _c2f

    PUBLIC _show

    EXTRN _PRINTF:NEAR

    _c2f PROC NEAR

            PUSH BP

            MOV BP,SP

            PUSH SI

            MOV AX, WORD PTR [BP + 4]

            MOV DX,9

            MUL DX

            MOV BX,5

            CWD

            IDIV BX
```

```
        MOV SI,AX
        ADD SI,32
        MOV AX,SI
        POP SI
        POP BP
        RET
    _c2f ENDP
    _show PROC NEAR
        push word ptr DGROUP:_tempf
        push word ptr DGROUP:_tempc
        mov ax, offset DGROUP:s@
        push ax
        call near ptr _printf
        add sp, 6
        ret
    _show ENDP
_TEXT ENDS

_BSS segment word public 'BSS'
EXTRN _tempf:WORD



_BSS ends
_DATA segment word public 'DATA'
EXTRN _tempc:WORD

_DATA ends
```

END

Compilation /Running and Debugging steps:

- Clearly mention each step. (For reference use my ppt or you can refer Experiment-6 from the lab manual)

  1. Create c2fshow.c file using TurboC++ and importing c2f1show() and

  show_data() from asm file. Compiling file until no error in file.

  2. Create c2fshow.asm file using Notepad++ and write code for c2fshow()

  and show_data() which is used in c file. Also extern the printf fuction from the

  c library file for show_data function.

  3. After creating asm module run following command in DOSBox after mounting

  the drive where tasm folder is stored and create obj file

  >tasm c2fshow.asm

  4. Move the c2fshow.obj file from tasm folder to TurboC3\bin.

  5. Launch TurboC++ and Go to the project menu and select open project.

  6. When dialog box appears, type c2.prj.

  7. Use the add item option in project menu and add c2fshow.c and

  c2fshow.obj file. After this press done option of dialog box.

  8. Go to the option menu and select linker. In this menu go to the case sensitive

  link and press enter key to turn it off to avoid Upper/lower case disagreements

  between asm and c file.

  9. Go to compile menu, select build all and press enter key to combine c and asm

  file and converted into obj file.

  10.Go to run menu and select run to run the project.

Output: Screenshot of output. (Fonts should be clearly visible for your output.)