Practical No. 2: Use Assembly language Programming Tools and Functions

I Practical Significance

Assembly language is used to write program in the form of mnemonics that is the short form of operations i.e. for addition *add* and operands, which may be registers or memory location. In operating system, system program is normally written in assembly language using tools like assembler, linker and for debugging debugger. Hence, students will be able to use various such tools required for assembly language programming.

II Relevant Program Outcomes (POs)

PO2- Discipline knowledge
PO3- Experiments and practice
PO4- Engineering Tools

III Competency and Practical Skills

"Develop assembly language program using 8086"

This practical is expected to develop the following skills

1. Use editor to write assembly language program *filename.asm* file
2. Use assembler and linker to create *filename.exe* file
3. Use debugger in single step mode to locate/trace the errors and correcting the errors

IV Relevant Course Outcome(s)

a. Use assembly language programming tools.

V Practical Outcomes

a. Use the assembly language programming tools and functions.

VI Relevant Affective Domain Related Outcomes

a. Follow precautionary measures.
b. Demonstrate working as a leader / a team member.
c. Follow ethical practices.

VII Minimum Theoretical Background

a. **Editor:** An editor is a program, which is used to construct assembly language program in appropriate format so that the assembler will translate it correctly to machine language. Therefore, you can type your program called as source program using editor. The **DOS** based editor such as **EDIT** can be used to type your program.

e. Once the assembly language program is created, then type *tasm filename*.asm on the command prompt and press Enter Key to create *filename.obj* file

f. Type *tlink filename.obj or tlink filename* on command prompt and press Enter Key to create *filename .exe* file.

g. Finally, type *debug filename.exe* or *td filename.exe* on the command prompt and press Enter Key to debug your program step by step.

h. Observe the contents of registers, memory location used and status of flags.

XII Resources used (Additional)

Windows 11 – 15 – 11th generation

TASM Version – 1.4 Debugger – DLINK

Editor – Microsoft Word Document

Linker – TLink

XIII Observations

1) Observe and write the contents of Register using debugger TD or Debug

Table 1: Contents of Registers

Types	Registers		Flag Register		
General Purpose registers	AX	48AE	Carry Flag	CF	0
	BX	0004	Zero Flag	ZF	0
	CX	0000	Sign Flag	SF	0
	DX	48AE	Overflow Flag	OF	0
Index Register	SI	0000	Parity Flag	PF	0
	DI	0000	Auxiliary Carry Flag	AF	0
Base Pointer	BP	0000	Interrupt Flag	IF	1
Stack Pointer	SP	0000	Direction Flag	DF	0
Segment Register	DS	489D			
	ES	489D			
	SS	489C			
	CS	48AD			
Instruction register	IP	0019			

2) Observe and write the contents of memory location in Code Segment using debugger TD or Debug

Table 2: Contents of memory location in Code Segment

Address	Contents	Address	Contents
CS:0000	BBAE48	CS:0008	–
CS:0001	–	CS:0009	–
CS:0002	–	CS:000A	–
CS:0003	88D0	CS:000B	0000
CS:0004	–	CS:000C	–
CS:0005	8009	CS:000D	0000

CS:0006	—	CS:000E	—
CS:0007	B334	CS:000F	0000

3) Observe and write the contents of memory location in Data Segment using debug TD or Debug

Table 3: Contents of memory location in Data Segment

Address	Contents	Address	Contents
DS:0000	CD	DS:0008	AD
DS:0001	20	DS:0009	DE
DS:0002	FF	DS:000A	E0
DS:0003	9F	DS:000B	01
DS:0004	00	DS:000C	C5
DS:0005	EA	DS:000D	15
DS:0006	FF	DS:000E	AA
DS:0007	FF	DS:000F	01

XIV Practical related Questions

Note: Below given are few sample questions for reference. Teachers must dev more such questions to ensure the achievement of identified CO.

1. Write the assembly language tools used in your lab in Table 4.

Table 4: Tools Used

Sr. No.	Tools Used	Name of Tool	Version
1	Editor	Microsoft Word	
2	Assembler	Jasm	1.2
3	Linker	Tlink	2.0
4	Debugger	Td	

2. List the files extensions that are created by the Assembler used.

The file extensions that are created by Assembler used
• exe
• obj

3. List the files extensions that are created by the Linker used.

The files extensions that are created by linker
• exe
• map