

## STUDY ASSIGNMENT

Title: Introduction to Assembly language programming

Aim: To study assembler, linker, masm, tasm and assembly language programming x86 instructions set

### Objective:

To be familiar with the format of assembly language program structure and instructions.

### Theory:

#### Assembly language:

An assembly language is a low-level programming language for computers, microprocessors, microcontrollers, and other integrated circuits. It implements a symbolic representation of the binary machine codes and other constants needed to program a given CPU architecture. This representation is usually defined by the hardware manufacturer, and is based on mnemonics that

symbolize processing steps (instructions), processor registers, memory locations, and other language features. An assembly language is thus specific to certain physical or virtual computer architecture.

Assembler:

It is a system program which converts the assembly language program instructions into machine executable instructions. For example:

Microsoft Macro Assembler (MASM), Borland Turbo

Assembler (TASM), Open source Netwide Assembler (NASM) etc.

MASM

The Microsoft Macro Assembler (MASM) is an x86 assembler for MS-DOS and Microsoft Windows. It supports a wide variety of macro facilities and structured programming idioms, including high-level functions for looping and procedures. Later versions added the capability of

Producing programs for windows.

### TASM

TURBO Assembler (TASM) is an x86 assembler package developed by Borland. It is used with

Borland's high-level language compilers, such as Turbo Pascal, Turbo Basic and Turbo C. The

TURBO Assembler package is bundled with the linker, Turbo Linker, and is interoperable with the Turbo Debugger.

### NASM

The Netwide Assembler (NASM) is an assembler and disassembler for the Intel x86 architecture.

It can be used to write 16-bit, 32-bit (IA-32) and 64-bit (x86-64) programs. NASM is considered

to be one of the most popular assemblers for Linux and is the second most popular assembler overall, behind MASM.

NASM was originally written by Simon Tatham with assistance from Julian

hall, and is currently maintained by a small team led by H. Peter Anvin.

## Linker

Linker or link editor is a program that takes one or more objects generated by a compiler and combines them into a single executable program. When a program comprises multiple object files, the linker combines these files into a unified executable program.

Linkers can take objects from a collection called a library. Some linkers do not include the whole library in the output. They only include its symbols that are referenced from other object files or libraries.