

Segment Structure of Programs. Stack. Hardware organization of Interrupts System. Input/output system.

**1. Structure of programs in
Assembly.**

**2. Example of a program in
Assembly.**

3. Program's Image in RAM.

1. What is a structure of a system?

Structure of system is actually a set of its elements and interconnections (interfaces) among them that determine a system's composition and functioning, its properties and stability.

;A simple program with three segments

*;At first point out correspondence of segment registers to segments
assume CS:code,DS:data*

;now describe the code segment

code segment ;Open the code segment

begin: mov AX,data ;Tune DS

mov DS,AX ;on the data segment

;Input on the screen a string of the text

mov AH,09h ;The DOS function of input on the screen

mov DX,offset msg ;Address of the input string

int 21h ;Call of DOS

;Complete the program

mov AX,4C00h ;DOS function of the program completion

int 21h ;Call of DOS

code ends ;Close the code segment

;Describe data segment

data segment ;Open data segment

msg db "The program is working !\$";The sting to be output

data ends ;Close the data segment

;Describe the stack segment

stk segment stack ;Open segment stack

db 256 dup (?) ;Allot for the stack 256 bytes

stk ends ;Close the stack segment

end begin ;The end of the text with an entry point

mov AX,data

assume CS:code,DS:data

end begin

Text of any program includes **key words**, which may be divided into: **instructions(commands) of processor** and **directives(pseudo-instructions) of translator.**

Instructions(commands) are such expressions, which determine concrete operations to be executed by the computer (each instruction determines only one operation) and their (its) operands.

Directives(pseudo-instructions) are intended for the transfer of service information to the translator, which is necessary during the process of the program assembling.

2. What (simplest) type of elements does a standard assembly program include?

Standard assembly program includes different (simplest) types of elements or **key words**, which may be divided into: **instructions (commands) of processor** and **directives (pseudo-instructions) of translator**. From these elements corresponding sentences (statements or lines) are composed.

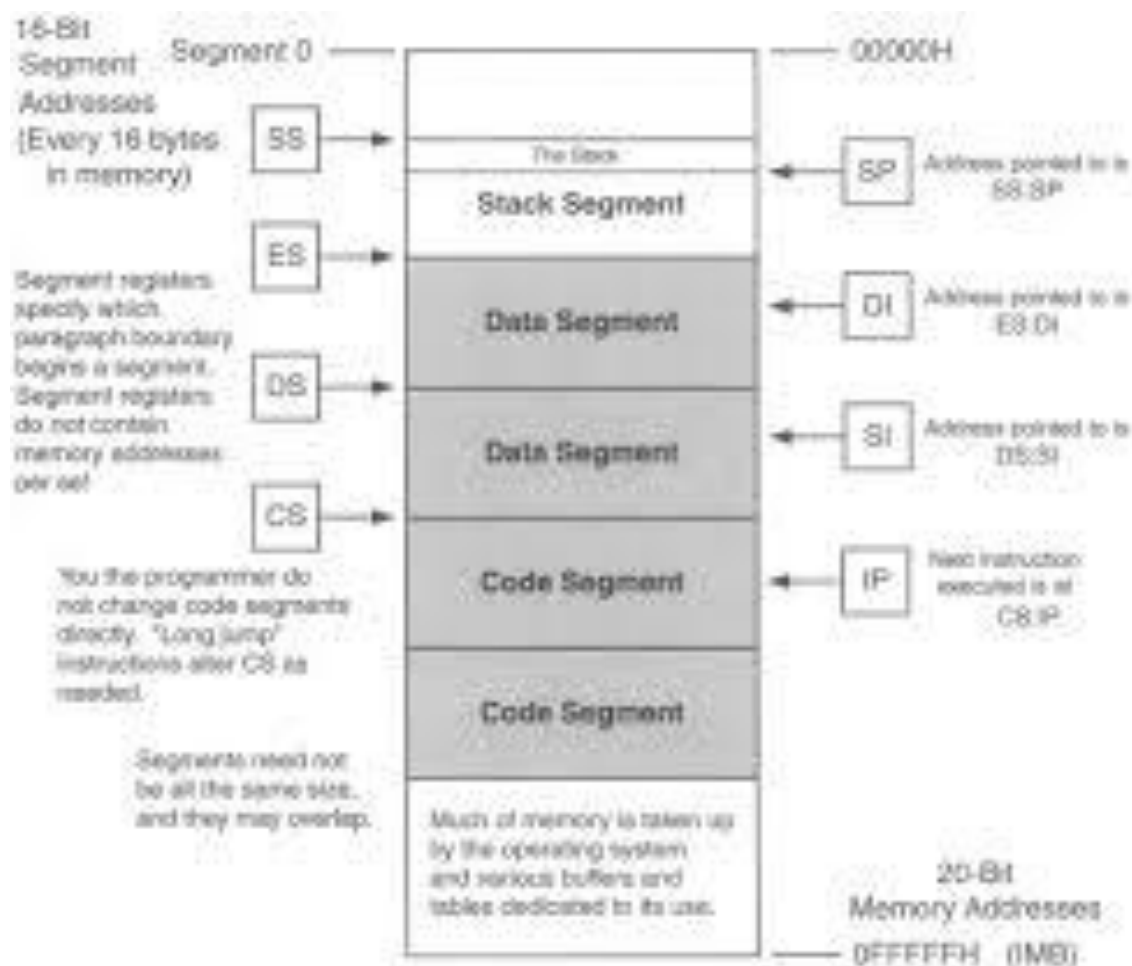
Structure of Assembly Language

- Assembly language instruction includes:
 - a **mnemonic** (abbreviation easy to remember)
 - the commands to the CPU, telling it what those to do with those items
 - optionally followed by **one or two operands**
 - the data items being manipulated
- A given Assembly language program is a series of statements, or lines
 - Assembly language instructions
 - Tell the CPU what to do
 - Directives (or pseudo-instructions)
 - Give directions to the assembler



3. What is a segment of a program in Assembly?

Segment in Assembly program is a part of it used to contain a specific type of statements (or data).



4. What types of program segments are used in Assembly?

One segment is used to contain **instruction codes**, another segment stores the **data elements**, and a third segment keeps the **program stack**.

5. What is for is data segment used in Assembly?

Data segment – It is used to declare the memory region, where data elements are stored for the program. This section cannot be expanded after the data elements are declared, and it remains static throughout the program.

7. What is for is code segment used in Assembly?

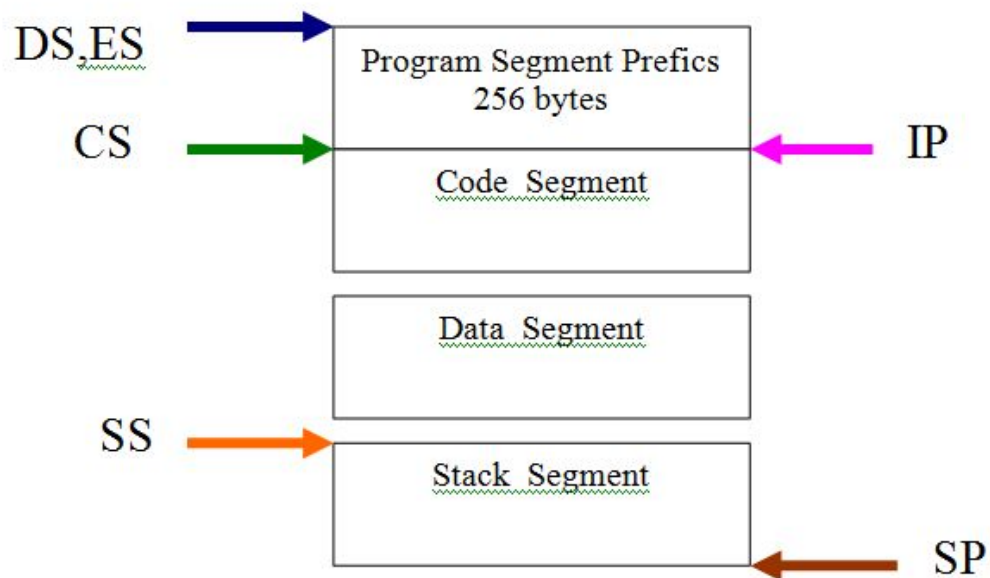
Code segment – It is represented by **text** section. This defines an area in memory that stores the instruction codes. This is a fixed area.

8. What is for is stack segment used in Assembly?

The **stack** memory **segment** is an area of memory allotted for automatic variables. Automatic variables are allocated and de-allocated automatically when program flow enters and leaves the variable's scope. **Stack** memory is allocated and de-allocated at the top of the **stack**, using Last-In-First-Out (LIFO).

Program's Image in RAM

During the program's loading the segments are located in RAM as it is shown in the picture:



9. What is for Program Prefix segment is used in Assembly?

The **Program Segment Prefix (PSP)** is a data structure used in DOS in systems to store the state of a program and important service information. It's elaborated by DOS automatically during program loading process.

The Stack

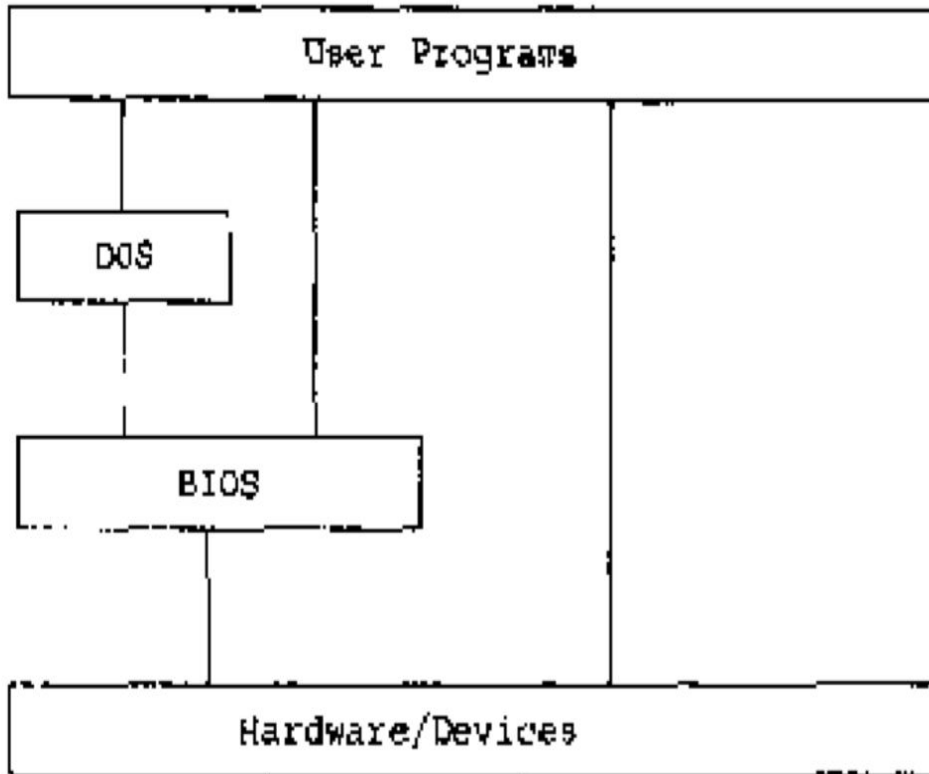


Figure 1-2 Input-Output Interface

ments and is the method used for more serious programs. This book makes use of both types