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Assignment #01
COAL

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Role of compiler and OS to execute a program:

It reads the source code and provides an executable code.
It translates the programs written in high-level language(human can understand)
To low level language(Machine can understand). The executable code will be
Converted into the binary code that a CPU can understand.

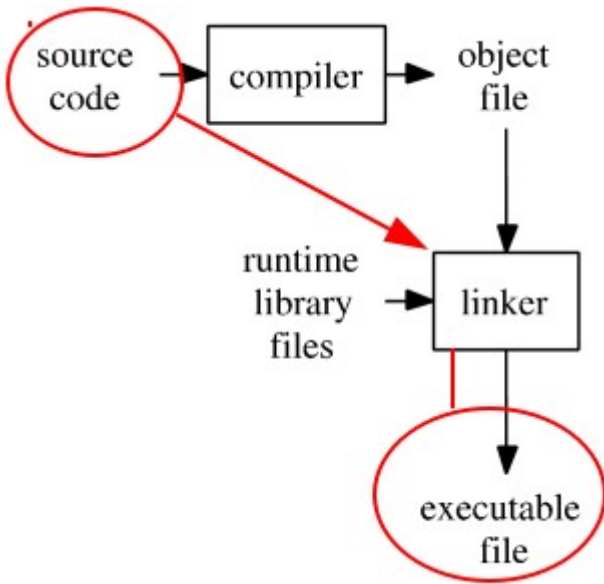
A compiler uses chunks of dynamically allocated memory resources.
And directly or indirectly uses the OS to get those memory resources.

Why is the process of Linking is performed ?

Linking is the process of collecting and maintaining piece of code and data Into a single file. It also links the modules into the system library.

It takes object module from assembler as an input and forms
An executable file as output.

Also a linker is used to link one or more object files to create a **Run file**.



In this diagram we can understand that how
A assembly language program is executed
And what is the purpose of linker in this process

Explain the contents of segment register in Real memory addressing mode ?

Segment Registers: Segment registers are basically memory pointers located Inside the CPU.

The code segment register defines the starting address of the section of memory Holding address. In real mode operation, 16-bit segment register indicate base Addresses of preassigned memory areas named segment

In protected mode, segment registers hold pointers to segment descriptor tables.

The descriptor describes the location, length and access rights of the memory segment.

Each segment has its own functionality some hold program instructions(code)
Others hold variables (data), and another segment stack segment holds local function
Variables and function parameters.

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3. Find the Missing value (directed by "?");

→ a) Segment: $AB0E0h$
Offset: $5D89h$
Real address: ?

$$\text{Real Address} = \text{Segment} \times 10 + \text{Offset}$$

$$\text{Real Address} = AB0E0 + 5D89h.$$

$$\boxed{\text{Real Address} = B0E69} \text{ dm.}$$

→ b) Segment: $8FF3h$
Offset: ?
Real Address: $A835bFh$

$$\text{Offset} = \text{Real Address} - \text{Segment}$$

$$\text{Offset} = 0A835Fh - 8FF3h$$

$$\boxed{\text{Offset} = 1842F} \text{ dm.}$$

→ c) Segment: ?
Offset: $5E6Dh$
Real Address: $FF41Dh$

$$\text{Segment} = \text{Real Address} - \text{Offset}$$

$$\text{Segment} = FF41D - 5E6D$$

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d) Segment: SF6Eh (here "segment is assumed")
offset: ?
Real Address: A5B6Dh
$$\text{offset} = \text{Real Address} - \text{Segment}$$
$$\text{offset} = \text{A5B6D} - \text{SF6E0}$$

offset = 9FBFF

 answer.

why .class file of JAVA is platform independent; whereas executable file (Machine Code) generated on Java is platform dependent?

Java code / Bytecode is always the same on different OS. That makes java Program as platform independent.

JVM is platform dependent that means there are different implementation of JVM On different OS.

Discuss the similarities and differences between real-address mode and virtual-8086 mode.

- Only 1 MB of memory can be addressed from 0 to FFFFF (hex)
 - Programs can access any part of main memory.
 - MS DOS runs in real address mode.

Programs running in real-address mode can cause the operating system to crash (stop responding to commands)

Virtual Mode

It is a special case of protected mode.

Processor runs in protected mode, and create a virtual 8086 machine
With 1 MB of address space for each running program, such as: MS-DOS

If an MS-DOS program crashes or attempts to write data into the system memory area
It will not affect programs running at the same time

Windows XP can execute multiple separate virtual-8086 sessions at the same time.

Explain the purpose of control flags and status flags ?

Status flag: The status flags Reflect the result of executing an instruction which reflect the result of executing an instruction.
It also controls the Arithmetic operations.

Control Flag: The control flag enable or disable certain CPU operations.