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Assignment 01
Coal BCS-3J
23K-0800

QUESTION 01

a) High level languages:

- These are the programming language which can be easily understood and learn by human, as most of these languages consists of english keywords for instructions.
- These languages are independent of machines, but they need to be compiled by a compiler to execute on specific machines.

Assembly language:

- Assembly language is a type of low level language which is a machine specific.
- ~~They~~ It is not portable as its ~~syntax~~ syntax varies from hardware to hardware.
- To execute ~~out~~ assembly language on machine, an assembler is needed to convert them into machine understandable code.

+ Similarities between both:

- Both languages need a program to execute their instructions on machine. For high-level language, it is compiler, for

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~~machine~~ assembly language, the program is called assemblers.

- Both contains loops, variables, conditional logics., but with different syntax.

Relationship:

- High level language has one-to-many relationship with assembly language.
- One instruction in high level language could be converted to many small instructions in assembly language

E.g.,

HLL:	Assembly language
a = b+c	~~add eax.~~ mov. eax, b add. eax, c mov. c, eax.

b

Assemblers.	Compilers
• These are the programs that converts assembly code to machine language. • It is difficult to debug the code in assemblers.	a) Compilers are used by HLL to compile or convert the code to machine language. ⇒ Debugging is easy when compared to assemblers.

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c) High level languages are more portable than assembly language because they are machine independent - you can run the same code on different machines without any modification. These language uses compilers to convert the code to machine understandable forms. It is compiler's tools to convert the code for specific machines understandable form.

- Assembly language code written for x86 architecture, would not run on any other processor without any modification.

QUESTION 2

Virtual machine ~~concept~~ is a software program that emulates function of some other physical or virtual computer.

Level 3 is Vm(2)
Level 2 is Vm(1)
level 1 is Vm(0)
level 0 is Vm(0)

- The code is compiled from HLL to assembly language i.e. from Vm(2) to Vm(1).
- Translation occurs from Vm(1) to Vm(0).

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(Q3) MOV EAX, F0F8F0F0h.

ADD EAX, 10000100h.

a) addng bdm

① → carry.

```
1111 0000 1111 1000 1111 0000 1111 0000
0001 0000 0000 0000 0000 0000 0001 0000 0000 +
000 0000 1111 1000 1111 0001 1111 0001
```

CF = 1 ZF = 0 OC = 0

PF = 0 AF = 0 of =

(b)

It is because it uses 20 bit address. raising from 0 to FFFF to access the memory.

(c) 12AB:025F

Physical address = (Segment address × 10) + offset

= (12AB × 10) + 025F

= 12AB0 + 025F

= 12AB0
025FF
0

=> 12AB0

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(d)

- 8086 processor is a 16 bit architecture it can use 16 bit architecture at max, and not more bit than

8086 processor is a 16 bit architecture hence it uses 16-bit registers for efficiency.

- 16-bit segment value is placed in segment register the CPU automatically converts a 16 bit segment & a 16 bit offset value into a 20 bit linear address.

QUESTION 4

```
INCLUDE Irvine.inc
.data
    monday      equ "Monday", 0
    tuesday     equ "Tuesday", 0
    wednesday   equ "Wednesday", 0
    thursday    equ "thursday", 0
    friday      equ "friday", 0
    saturday    equ "saturday", 0
    sunday      equ "sunday", 0.

.code
...
...
END MAIN
```

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Question 5

```
INCLUDE Irvine32.inc

.data

var a   DWORD   5 DUP(?)
var b   BYTE    2 DUP(?)
var c   BYTE    15 DUP("8")
var d   BYTE    7 DUP("%")
var e   BYTE    1 DUP("M").

.code
main PROC
exit
main ENDP
END main
```

Question 6

(1)

```
   1000      1000
+  1001      0000
 1 0001      1000
```

Carry flag = 1
OF = 0
al = 18h

ii) 123 = 7B

5 = 5

```
  0000  0101
+ 0111  1011
  1000  0000
```

al = 80h

Sign Flag = 1.

CF = 0

OF = 1

QUESTION 7

A) eax = 2000 1000

B) ebx = 0020 0010

c) ecx = 3000 2000

d) edx = 1130 0020

There is no error in the program. It will run without any flaws.