

HAMMAD PER

ID # 6961

SUBJECT

MICROPROCESSOR

&

ASSEMBLY LANGUAGE

Q2:-(i) Real address mode and protected mode?

Ans:- Real Mode:-

Real mode also called real address mode, is an operating mode of all x86-compatible CPUs. The mode get its name from the fact that addresses in real mode always correspond to real location in memory.

(*) PROTECTED MODE:-

Protected mode is a 32-bit operating mode found on intel 80286 or newer processors, it provides the addressing, virtual memory, extended memory and multitasking

while protecting programs from overwriting one another in memory.

(b) Instruction and directive :-

INSTRUCTION :-

Definition :-

Is that instruction is the act of instructing, teaching, or furnishing with information or knowledge.

Directive :-

Definition :-

Directive is an instruction or guideline that indicates how to perform an action or reach a goal.

3.

① Equal-sign directive and EQU directive?

Equal Sign Directive:-

The equal sign directive associates a symbol name with an integer expression. The syntax is name = expression.

EQU Directive:-

Def:-

The EQU directive gives a symbolic name to a numeric constant, a register relative value or a PC-relative value.

Syntax: Name EQU Constant.

For Example:-

Maximum EQU 99 after using this directive, every appearance

of the label "MAXIMUM" in the program will be interpreted by the assembler as the number 99.

(d) Data label and Code label:-

Data Label:-

Data labels are used to display source data in a chart directly. They normally come from the source data, but they can include other values as well, as well see in a moment. Generally, the easiest way to show data labels to use the chart elements menu.

Code Label:-

Def:-

A label in a programming language is a sequence of characters that identifies a location within source code. In most languages labels take the form of an identifier, often followed by a punctuation character.

Example:- (a., colon)

(e) Status flags And Control flags:-

STATUS FLAGS:-

A status register, flag register or condition code register (CCR) is a collection of status flag

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bits for a processor.

For Example :-

a Z. bit may be set if the result of the operation is zero and cleared if it is non zero. Other classes of instructions may also modify the flags to indicate status.

CONTROL FLAG:-

The control flags indicate how a successful attempt or a failed attempt through each module is handled. Even though these flags apply to all modul types, the following explanation assumes that these flags

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are being used for authentication
modules.

Q:- Discuss the virtual machine concept using examples?

Ans:- A virtual machine (or "VM") is an emulated computer system created using software. It uses physical resources, such as the CPU, RAM, and disk storage but is isolated from other software on the computer.

Examples:-

Include Microsoft Hyper-V Manager, VMware Workstation Pro, and Parallels Desktop. These applications allow you to run multiple VMs on a single computer.

9.

(b) Explain different register used in x86 32-bit processors?

Ans:-

With the chips beginning to support a 32-bit data bus, the registers were also widened to 32 bits. The names for the 32-bit registers are simply the 16-bit names with an "E" prepended.

EAX, EBX, ECX, EDX, ESP, EBP, ESI, EDI

These are the 32 bit versions of the registers shown above.

* EIP:-

The 32 bit version of IP. Always used this instead of IP on 32-bit systems.

EFLAGS:-

An expanded version of the 16-bit flags register.

EAX:-

EAX is automatically used by multiplication and division instructions. It is often called the extended accumulator register.

ECX:-

The CPU automatically uses ECX as a loop counter.

ESP:-

ESP addresses data on the stack (a system memory structure). It is rarely used for ordinary arithmetic or data transfer. It is often called the extended stack pointer register.

ESI AND EDI :-

ESI and EDI are used by high speed memory transfer instructions. They are sometimes called the extended source index and extended destination index registers.

EBP :-

EBP is used by high-level languages to reference function parameters and local variables on the stack. It should not be used for ordinary arithmetic or data transfer except at an individual advanced level of programming. It is often called the extended frame pointer register.

(C) Discuss different features of intel P965 Express chipset?

→ It is used in desktop PCs, with either an intel Core 2 Duo or a pentium D processor. Here are some of its features.

→ Intel Fast memory Access uses an updated memory Controller Hub (MCH). It can access dual channel DDR2 memory, at an 800 MHz clock speed.

→ An I/O Controller Hub (Intel ICH8/R/DH) uses Intel Matrix Storage Technology (MST) to support multiple Serial ATA device.

→ Support for multiple USB ports
multiple PCI express slots,
networking and intel Quiet
System Technology.

→ A high definition audio chip
provides digital sound capabilities.

→ Motherboard manufacturers
will build products
around specific chipsets.

For Example:-

The P5B-E P965 motherboard
by Asus Corporation uses
the P965 chipset.

(d) Elaborate different I/O levels
involved in displaying
a string of characters?

14.

Ans: We can put the I/O hierarchy into perspective by showing what happens when an application program displays a string of characters on the screen.

The following steps are involved:-

1. A statement in the application program calls an HLL Library function that writes the string to standard output.

② The library function level calls an operating system function passing a string pointer.

3. The OPS function uses a loop to call a BIOS Subroutine, passing it the ASCII code and color of each character.
4. The BIOS Subroutine receives a character, maps it to a particular system font and sends the character to a hardware port attached to the video.
5. The video controller card generates timed hardware signals to the video display that control the raster scanning and displaying of pixels.

(16)

Q4:- (C) Write a program that calculates the following expression using registers?

$$D = (C + B) - A$$

Ans: .386

model flat, stdcall

Stack 4096

Exit process PROTO, dword ExitCode
Dword.

. Code

Main PROC.

mov ecx, 3h

mov ebx, 8h

mov eax, 5h

add ~~eax~~, ebx

sub eax, ecx

Invok Exit Process 0
main ENDP
END Main.

(a) Show the order of individual bytes in memory for the following double word - ?

Ans^r Order of double word in memory is as following

0000	21
0001	43
0002	65
0004	87

Val
DWORD 12345678h ↑↑

(b) Write a statement that causes -- ?

Ans^r Assembler statement to calculate the number of bytes in given string is as following.

(18)

my string BYTE \equiv I am student
of INU^m

my string len = (\$ - my string)

OR

Size - string = (\$ - my string)

(d) Write a program that
performs arithmetic -- ?

Ans: A simple Assembly program
that perform the following
Arithmetic operations.

Program A = (A+B) - (C/D)

* model flat stdcall

* Stack 4096

Exit process presto, dw Exit
code

• code

(19)

main PROC

, assign the integers values to register.

mov eax, 150 ; A = EAX = 150

mov ebx, 100 ; B = EBX = 100

mov ecx, 50 ; C = ECX = 50

mov edx, 40 ; D = EDX = 40

, Calculate the expression.

add eax, ebx ; EAX = (A+B)

DIV ecx, edx ; ECX = (C/D)

Sub eax, ecx ; EAX = (A+B) - (C/D)

Invoke exit processor

main ENDP

END main.

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Q3(i) If $w = 11101100$, $x = 00010011$,
and $y = 00111100$, then find
 $z = w \vee x \wedge y$?

W	X	Y	\bar{Y}	$W \vee X$	$(W \vee X) \wedge \bar{Y}$
1	0	0	1	1	1
1	0	0	1	1	1
1	0	1	0	1	0
0	1	1	0	1	0
1	0	1	0	1	0
1	0	1	0	1	0
0	1	0	1	1	1
0	1	0	1	1	1

Q3(b) Create a truth table for the
boolean described by $\bar{A} \wedge \bar{B}$?

A	B	$\bar{A} \wedge \bar{B}$
F	F	T
F	T	F
T	F	F
T	T	F