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Computer - Engineering

17/Eric02/030 (300 Level)

COE 306 (Assembly Language)

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Question 1

(1b) The type of files produced by the assembler are;

(i) Object file (OBJ)

(ii) Listing files

(1c)

(1c) it won't be good to use numeric addresses when writing instructions that access variables because the addresses coded in the instructions would have to be updated whenever new variables were inserted before existing ones.

Question 2

(2c) 32-bit registers

16-bit registers

	16-15	8-7	0-7	
EAX	AH	AL	Ax	Accumulator
EBX	BH	BL	Bx	Base
ECX	CH	CL	Cx	Counter
EDX	DH	DL	Dx	Data

Ax is the primary accumulator, it is used in input/output and most arithmetic instructions.

Bx is known as the base register, as it could be used in indexed addressing.

Cx is known as the counter register, as the ECX.

Dx is known as the data register, it is used in input/output operations.

Qb) No it is not because each assembly language is for a specific computer or processor.

Qc) Portability in programming language refers to when a program can be used on other operating systems other than the original one it was intended for without needing major changes to the codes.

```

(4) TITLE Add Subtr
; This program
; Integers and
INCLUDE Irvine
; data
Val1 DWORD 10
Val2 DWORD 4
Val3 DWORD 5
finalVal DWORD
; Code
main PROC
INCLUDE Ir
; Code
Main PROC
mov eax, 90
sub eax, 40
sub eax, 20
call Dump
exit
  
```

AX	Accumulator
CX	Counter
DX	Data
SI	Source Index
DI	Destination Index
BP	Base Pointer
IP	Instruction Pointer

AX is the primary accumulator, it is used to store the results of arithmetic instructions. It is also used to store the address of the next instruction to be executed.

CX is known as the counter register, it is used to store the number of times to repeat an instruction.

DX is known as the data register, it is used to store data.

SI is known as the source register, it is used to store the address of the source operand.

DI is known as the destination register, it is used to store the address of the destination operand.

BP is known as the base pointer, it is used to store the address of the base of the stack.

IP is known as the instruction pointer, it is used to store the address of the next instruction to be executed.

Name:

2

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```
(4) TITLE Add Subtract, Version 2 (AddSub2.asm)
; This program adds and subtracts 32-bit Unsigned
; Integers and Stores the Sum in a Variable.
INCLUDE Irvine32.inc
.data
Val1 DWORD 10000h
Val2 DWORD 40000h
Val3 DWORD 20000h
finalVal DWORD ?
.code
main PROC
INCLUDE Irvine32.inc
.code
Main PROC
mov eax, 90000h ; EAX = 10000h
sub eax, 40000h ; EAX = 50000h
sub eax, 20000h ; EAX = 30000h
call DumpRegs ; display registers.
exit
```

Name;

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(3a) When an assembly language program is assembled, the translation that the assembler carries out is essentially the construction of the text segment and the data segment (The stack grows and shrinks along with function calls and returns during execution, so it doesn't need to be built by the assembler.)

(3b) The assembly language for x86 processors are not the same for other computer systems such as ARM because each assembly has its own specific processor or computer.