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SUBJ/SEC: _COMPUTER ARCHITECTURE AND ORGANIZATION_ / BSCOE 4-6_ **PROFESSOR : Engr. Rolito L. Mahaguay**

EXPERIMENT NO. 1
FAMILIARIZATION WITH DEBUG COMMANDS

OBJECTIVE (S):

1. To familiarize students in using DEBUG commands.
2. To investigate the 8088 and familiarized with their functions.
3. To be able to construct an assembly language program using DEBUG.

REQUIREMENTS :

Personal Computer
System disk
Data disk

DISCUSSION:

DOS_DEBUG.COM

DOS offer a debugging utility as one of its internal commands. The DEBUG program can be use to:

- Provide a controlled testing environment so you can monitor and control the execution of program.
- Load, alter or display any file
- Execute object files. Object files are executable programs in machine language format.

DEBUG_COMMMANDS

- The prompt from DEBUG program is a hyphen ***(-)***
- A command is a single letter, usually followed by one or more parameters, commands become effective only after you press the ***ENTER KEY.***
- Commands and parameters can be entered in uppercase or lowercase, or a combination of both.
- Delimiters may separate commands and parameters.

PROCEDURES:

1. Invoke DEBUG from the PC's RAMDRIVE. Write down the command you use.

- **debug**

2. Investigate the register using the R Command. The R (register) has common function.

Function 1: R
It display the hexadecimal of all the registers, plus the alphabetic flag settings and the next instruction to be executed.

Function 2: R < register name>
Display the hexadecimal contents of a single register with the option of changing the contents. To display the contents of a single register (ie., AX) enter:

- **R AX**

AX 0000
: _

Change the contents of the AX register by entering 1-4 character hexadecimal value.

Use the DEBUG R command to display the contents of the registers. What are the contents of the following registers?

```
C:\TASM>debug
-r
AX=0000 BX=0000 CX=0000 DX=0000 SP=FFFE BP=0000 SI=0000 DI=0000
DS=072A ES=072A SS=072A CS=072A IP=0100 NV UP EI NG NZ NA PO NC
072A:0100 C3                RET
```

a. General-Purpose Registers

- AX = 0000
- BX = 0000
- CX = 0000
- DX = 0000

b. Pointer and Index Registers

- SP = FFFE
- BP = 0000
- SI = 0000
- DI = 0000
- IP = 0100

c. Segment Registers

- DS = 072A
- ES = 072A
- SS = 072A
- CS = 072A

3. Change the contents of the CX register to 1352. Write down the complete DEBUG command that you use.

- **debug**
- **r**
- **rcx**
- **1352**

4. Load DEBUG enter assembly language program using ***A*** command. The ***A*** (assembler) command lets you enter mnemonic code assembly language instructions.

Format : A < address >

Address is assume to be an off set from the address in CS, unless another segment value is given.

Assemble the following code into memory location 1234:0100

```
1234:0100 mov ah,2
1234:0102 mov dl,41
1234:0104 int 21h
1234:0106 mov dl,43
1234:0108 int 21h
1234:010a mov dl,45
1234:010c int 21h
1234:010e int 20h
1234:0110
```

Save the program into disk with file name nsample.com

To write a file, it must first be initialized with the N command. The ***N command*** initialized a file name in the memory before using the load or write command.

Format : N [drive] [filename] . [extension]

Place the number of bytes to be written in BX and CX (BX contains the high 16 bits, and CX contains the low 16 bits. To change the contents of registers BX and CX with the size of the code you enter. The W (write) command writes a block of memory to a file.

g (go) command execute the program.

```
-r cx
cx 0000
:10
-w
writing 00010 bytes
-q
```

1. See the contents of the RAMDRIVE (C:\>dir).

a. Is the file sample.com present? YES
b. How many bytes does the file consume? 16 BYTES

2. Execute the program. What is the output? ACE

EXERCISES:

1. Write down the required program output from your instructor.

   - **FN, MI, LN : Miguel Carlos V. Gonzalez**

2. Encode the program.

```
072A:0152 mov dl, 7a
072A:0154 int 21
072A:0156 mov dl, 61
072A:0158 int 21
072A:015A mov dl, 6c
072A:015C int 21
072A:015E mov dl, 65
072A:0160 int 21
072A:0162 mov dl, 7a
072A:0164 int 21
072A:0166 mov dl, 0a
072A:0168 int 21
072A:016A int 20
072A:016C
-n c:MCVG.com
-rcx
CX 0000  :6c
-w
Writing 006C bytes
-q

C:\TASM>MCVG.com
Miguel Carlos V. Gonzalez
```

3. Ask your instructor to check your work

4. Copy the program to your data disk.

5. What are the purposes of the following DEBUG commands?

   a. R – Is used to display the various registers
   b. A – Is used to enter mnemonic code assembly language programs
   c. N – Is used to determine the path of the file and the name of the program
   d. W – Is used to save the program in the determined path
   e. T – Is used to trace CPU instructions one at a time

5. What number system does DEBUG uses?

   - **HEXADECIMAL**

6. Write the hexadecimal ASCII value for the following characters.

B - 42	<LF> - 0A
j - 6A	<CR> - 0D
a - 61	<SP> (space) - 20
d - 64	.(dot) – 2E

7. Explain the method you use in determining the number of bytes to be saved for a program.
   - To determine the number of bytes to be saved for a program, we must look at the last two Hexadecimal numbers in the offset/address of the current program.