

Student Name: _____ Student ID: _____

Show work with intermediate steps. Showing only the answer will get no credit.

Problem 1 – 30 points

Assume instruction “*bne \$FA*” is the next instruction in line and is executed. The op code for *bne* is located at address \$1000 and the entire instruction requires 2 bytes.

Assuming the z bit is set, will the branch be taken and what value will the Program Counter (PC) contain directly after this instruction completes?

Assuming the z bit was initially cleared, will the branch be taken and what value will the Program Counter (PC) contain directly after this instruction completes?

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Problem 2 30 points

- a) Provide the machine code (hand assemble) the instruction **ldaa # $\$AA$** followed by an **ldd $\$5555$** instruction (15pts) by filling out the table below. Assume the first instruction starts at location $\$1000$. (Note: not all locations below may be necessary in which case leave them blank).

Address	Contents
$\\$1000$	
$\\$1001$	
$\\$1002$	
$\\$1003$	
$\\$1004$	
$\\$1005$	
$\\$1006$	
$\\$1007$	
$\\$1008$	

- b) Given the contents of eeprom below and assuming the contents are instructions, create (hand dis-assemble) the corresponding assembly program (15pts).
Hint: more than one instruction is encoded below. Boundaries are important. The instructions are contrived so don't look for them to do something reasonable.

Address	Contents
$\\$0C00$	$\\$18$
$\\$0C01$	$\\$0B$
$\\$0C02$	$\\$55$
$\\$0C03$	$\\$10$
$\\$0C04$	$\\$00$
$\\$0C05$	$\\$43$

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Problem 3– 40 points

Assume the following function is executed.

```
PROGRAM_ROM EQU    $2000
ORG             PROGRAM_ROM
something:      ldaa  $00
               idx   #$0001
               adda  1,X+
               adda  1,X
               staa  1,-Y
               rts
```

	Initial value	After ldaa	After idx	After first adda	After second adda	After staa	After rts
Register A	\$80						
Register B	\$FF						
Register D							
Register X	\$3000						
Register Y	\$0005						
Memory \$0000	\$01						
Memory \$0001	\$02						
Memory \$0002	\$03						
Memory \$0003	\$04						
Memory \$0004	\$ff						
Memory \$0005	\$01						

Fill in only those values that change.