BRAC UNIVERSITY
Department of Computer Science and Engineering
Semester: Fall 2023
Section-9

Quiz-2
Duration: 35 minutes

Full Marks: 15

CSE 340: Computer Architecture

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1. **[CO2] Demonstrate** the equivalent MIPS code of the following code, where the base address B is in $s1and m is in $s2.
[6 marks]

```
m=17;
if(m>57)
{
   B[m]=B[m+3]/256;
}
else
{
   B[m+1]=B[m]*32;
}
```

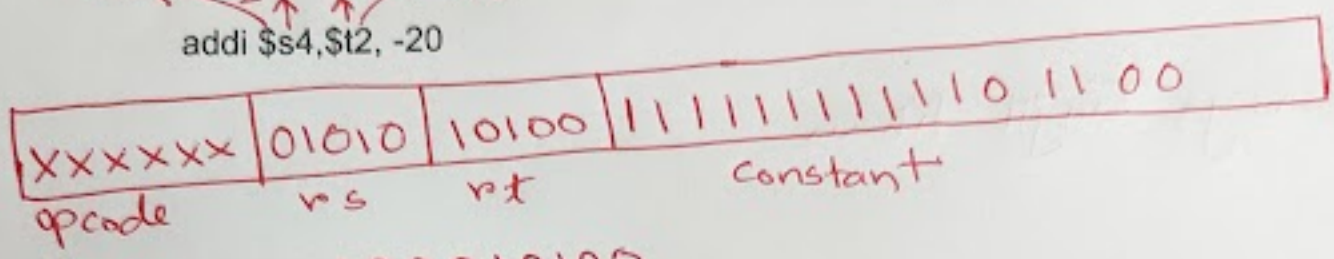
Ans:

```
addi $s2,$zero,17
slti $t0,$s2,57  //m<57
bne $t0,$zero,Else
addi $t1,$s2,3
sll $t1,$t1,2
add $t1,$t1,$s1
lw $t2,0($t1)
srl $t2,$t2,8
sll $t1,$s2,2
add $t1,$t1,$s1
sw $t2,0($t1)
j Exit
```

```
Else:
sll $t1,$s2,2
add $t1,$t1,$s1
lw $t2,0($t1)
sll $t2,$t2,5
addi $t3,$s2,1
sll $t3,$s2,2
add $s2,$s2,
sll $t3,$t3,2
add $t3,$t3,$s1
sw $t2,0($t3)
Exit:
```

2. a) **[CO2] Determine** the machine code of the following MIPS instruction.
[3 marks]

addi $s4,$t2, -20



20 = 0000000000010100

1111111111101011

\+ 1

1111111111101100

b) **[CO2]** Consider that the PC has the value (in hex) 0x80063121 and the offset value (in decimal) is 273 , then **calculate the unconditional** (jump) target address.
[6 marks]
NOTE- *You need to show all the work step by step.*

PC in hex = 80063121 , PC+4 = 80063125

(PC+4) in binary = 1000 0000 0000 0110 0011 0001 0010 0101
8 0 0 6 3 1 2 5

273 in binary (26-bit) = 00000000000000100010001

2bit Left shift (28-bit) = 00000000000000001000100100

Unconditional jump address = (PC+4)'s first 4 MSB bits joins with 2bit Left shift

= 1000 0000 0000 0000 0000 0100 0100 0100
8 0 0 0 0 4 4 4

= $(80000444)_{16}$