CSE3401 Computer Organization

Fall 2024 – HW#2

Due: 01.11.2024 23:55

1. **DO NOT COPY/PASTE SOLUTIONS FROM YOUR FRIEND's HW. WE WILL IGNORE COPY PASTE HOMEWORKS.**
2. **FORMAT OF THE SUBMISSION SHOULD BE AS FOLLOWING: "STUDENTNUMBER1_STUDENTNUMBER2.PDF" AND SUBMIT IT TO BLACKBOARD**
3. **PLEASE ALSO MENTION TEAM MEMBERS INFORMATION IN THE PDF FILE.**
4. **IF YOU DO NOT FOLLOW THE SUBMISSION FORMAT %10 OF PENALTY WILL BE APPLIED.**

Q1) Assume that the stack pointer points the address 0x1030 5010 and function inputs are passed using registers $a1, $a2 and $a3 and return value must be put in register $v0.

a.) Write the MIPS code for both of the main and func procedures below. If you use any saved registers save them to stack.

```
Main…
{
…
  int b = func(1, 3, 2);
…
}

int func(int a, int pow, int b){
   if (pow > 1)
      return (a+b)*func(a,pow-1);
   else
   b = a +1
   return b;
}
```

b.) Write down the values of stack that are changed during this call (memory below 0x1030 5010**)?**

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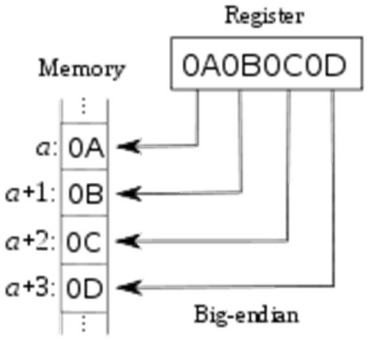
Q2) Table 1 (below) shows the memory. Integer array A is located at address 0x10000000, base address is in register $s0. Study the MIPS code instruction by instruction and determine the final values stored in the memory and registers ($t1, $t2, $s1).

Table 1 Register **$s0** has base address ((0x10000000) of array A. Data and address shown are all in base 16 (hex). Assume big-endian memory use.

Address				
0x1000000C	02	02	01	0F
0x10000008	BA	FF	BA	D0
0x10000004	FF	0F	B0	BB
0x10000000	AB	01	00	04



a) Comment each line of this code to explain what it performs?

1. lw $t1, 0($s0)
2. srl $t1, $t1, 14
3. lbu $t2, 12($s0)
4. addu $s1, $t1, $t2
5. sll $s1, $s1, 4
6. sw $s1, 4($s0)
7. sh $s1, 9($s0)

b) Write the final state of **the changed cells in Table 1** after above code is run.

c) Write the final values registers $s1, $ t1, $t2