CS130 HW17

Problem 1

Use your two MIPS reference handouts to determine the machine code for each of the following four instructions. Show your work in a manner similar to the class notes on the subject.

```
Address          Code
0x00400000               addiu $t1, $0,  4
0x00400004       LO:     beq   $t1, $0,  DONE
0x00400008               addi  $t1, $t1, -1
0x0040000c               bgez  $0,  L0
0x00400010       DONE:
```

add 0 and 4 and put into $t1
if $t1 = 0, then branch to DONE
decrement t1
if $0 >= 0 then branch to LO
DONE branch

The bgez instruction uses a special I-format with opcode = 000001 and $rt = 00001. The register named in the instruction is $rs and the offset is PC-relative. Note: negative offset is represented using 2's complement.

Problem 2

(a) Disassemble (reverse engineer) the machine code below into proper MIPS instructions. Show details of your work.
(b) Provide an RTN-like description of the computation.

```
0x020a6824          sll $k0, $s4, 1
0x000d6dc2          sll $k1, $k0, 14
0x21b3ff81          add $ra, $t5, $s3
```

```
   op     rs    rt    rd  shamt funct
• 000000|10000|01010|01101|00000|100100
• 000000|00000|01101|01101|10111|000010
• 001000|01101|10011|11111|11110|000001
```