

CPS 104 Midterm Exam

Answer all questions:

1) The following are two 12-bit two's complement numbers:

A = 111111011010

B = 000010110101

Compute $A+B$ and $A-B$ in two's complement.

2. Show the single precision floating point representation for -1.125

3. Translate the following assembly code fragment to (binary) machine code.

```
lui $4 5
lw $3, 125($13)
add $6, $4, $3
sw $6, 125($13)
```

4. Draw a circuit that implements the following Boolean function: use one or two input gates only.

A	B	C	F
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	0

5. Explain the difference between the two instructions:

a.

```
j <address>
```

and

```
jal <address>
```

6. Translate the following C code fragment to MIPS assembly.

```
int i, sum;
int a[100], b[100];
. . .
    sum = 0;
    for (i:= 0, i < 100, i++)
        sum = sum + a[i]*a[i] - b[i] ;
```

Assume that the array **a** starts at location 0x11000000
and array **b** starts at 0x1100a0000