Your Name:

Precept Time:

1. Translate the following C code to SPARC assembly language. You may use macros suitable for processing by m4 or give the assmbly codes directly. You don't have to fill the delay slots for this question.

```
int i=11,j=14;
register int r;

while (j) {
        r = i-j;
        if (r>0)
                i = r;
        else
                j = -r;
}
```

2. Explain following instructions, similar to the given examples.

example:

instruction	operation	description
ld [%o1], %o2	r[o2] = memory[r[o1]]	load register with word from memory (register indirect)
ba label	r[pc] = r[npc]; r[npc] = label;	branch always

1. and %o0, %o1, %o0

2. ld [%o1+%o2], %o3

3. st %o1, [%o2+20]

4. call label

3. The following fragment of C code

```
int a[10];

...
for (i=0;i<10;i++) {
        a[i] <<= 3;
        a[i] += i*4;
}
```

translates to the assembly language given below. Modify the assembly language to make it as efficient as you can.

```
        ...
        var(a_s, 4, 4 * 10)

        define(i_r, l0)
        ...
        clr     %i_r
        ba      test
        nop

loop:   sll     %i_r,2,%o0
        add     %fp,%o0,%o0
        ld      [%o0+a_s],%o1
        sll     %o1,3,%o1
        st      %o1,[%o0+a_s]

        sll     %i_r,2,%o2
        ld      [%o0+a_s],%o1
        add     %o1,%o2,%o1
        st      %o1,[%o0+a_s]

        add     %i_r,1,%i_r

test:   cmp     %i_r,10
        bl      loop
        nop
```