Login name _____ **Quiz 4** **Name** _____

CSE 131

Signature _____ **Spring 2010** **Student ID** _____

1. Project II Code Gen – Phase II.3:
What is the output of the following Reduced-C program:

```
int a = 2;
int b = 8;
int c;

function : int foo( int & x, int y )
{
  int z;

  y = x + 3;
  x = y + 3;
  z = x + y;

  cout << x << endl;
  cout << y << endl;
  cout << z << endl;

  b = x + 3;

  return a + 2;
}

function : int main( )
{
  c = foo( a, b );

  cout << a << endl;
  cout << b << endl;
  cout << c << endl;

  return 0;
}
```

Output

Fill in the blanks below to simulate the above in C. Basically what is really happening under the code.

```
int a = 2;
int b = 8;
int c;

int
foo( _______________ x, _______________ y )
{
  int z;

  _______ = _______ + 3;

  _______ = _______ + 3;

  z = _______ + _______;

  printf( "%d\n", ___________ );

  printf( "%d\n", ___________ );

  printf( "%d\n", z );

  b = _______ + 3;

  return _____________________;
}
```

```
int
main( )
{

  c = foo( ___________, ___________ );

  printf( "%d\n", a );
  printf( "%d\n", b );
  printf( "%d\n", c );

  return 0;
}
```

2. Assume the following local variable definitions

```
int   intVar;     // Local variable allocated at %fp - 4
float floatVar;   // Local variable allocated at %fp - 8
```

From the Project II Code Gen – Phase II.1 Specs, write the SPARC assembly code which should be generated for the following statement using the comments above to help identify where the variable is stored/located.

```
floatVar = intVar + floatVar;

 ld      [________], ______      ! get intVar value to conver to single precision float

 ________ %f0, %f0               ! convert to single precision float

 ________ %f0, [%fp-12]          ! store result in tmp1

 ld      [________], ______      ! get left operand for fp add op

 ld      [________], ______      ! get right operand for fp add op

 ________ %f0, %f1, %f0          ! perform fp add

 ________ %f0, [%fp-16]          ! store result in tmp2

 ld      [________], %f0         ! get right operand for assign op

 st      %f0, [________]         ! perform assign op
```

Pick one of the following to answer the questions below related to most calling conventions.

1) Pre-Call (Caller) 2) call/jsr 3) Post-Call (Caller) 4) Prologue (Callee) 5) Epilogue (Callee)

_____ Retrieves return value from return value location

_____ Stores return value into return value location

_____ Allocates space for local variables

_____ Copies actual arguments into argument space

_____ Saves %pc into the return address location

_____ Retrieves saved return address for return/rts

_____ Performs initialization of local variables

_____ Saves registers in callee-save scheme

Given the following variable definitions

```
static int x = 420;   // initialized static variable
int y;                // uninitialized global variable
```

write the SPARC assembly code which should be generated to properly allocate space for each along with their initial values and alignment and to ensure proper access/visibility to these variables if another file is linked to this code's object file.

```
        .section    _____________

        .align      ________

x:      __________  420

        .section    _____________

        .align      ________

y:      __________  ________

        __________  y
```