#1. Order the following storage elements/types from fastest to slowest

A) RAM (Main Memory)  B) Registers  C) L2 cache
D) L1 cache  E) Tape  F) Hard Disk

______ (Fastest)
______
______
______
______ (Slowest)

List the 2 main events that would cause a full context switch:

1)

2)

The ________________ is responsible for ensuring all symbols are known/defined.
The ________________ is responsible for getting an executable from disk into memory and ready to run.
The ________________ is responsible for combining all object files into a single executable file.

How many bits are needed in a SPARC Format 3 instruction to encode a specific register? ________

How many bits are available in a SPARC Format 3 instruction to encode an immediate constant? ________

#2. What gets printed if the following function is invoked as `recurse( 3, 6 )`?

```c
int
recurse( int a, int b )
{
    int local = a + b;
    int result;

    if (local <= 12)
        result = recurse( a + 1, b ) + local;
    else
        result = local;

    printf( "%d\n", result );
    return result;
}
```

(over)
#3. Given the following program, reorder the printf lines so that the values that are printed are sorted from smallest to largest if compiled and run on a Sun SPARC architecture. These lines print out the hex address of the different parts of the program (not the values assigned) with the printf() format specifier %p (pointer).

```c
#include <stdio.h>
#include <stdlib.h>

int a = -99;

int
main( int argc, char *argv[] )
{
    int b = -99;
    static int c;
    int d;

    /* 1 */ (void) printf( "d --> %p\n", &d );
    /* 2 */ (void) printf( "c --> %p\n", &c );
    /* 3 */ (void) printf( "b --> %p\n", &b );
    /* 4 */ (void) printf( "argv --> %p\n", &argv );
    /* 5 */ (void) printf( "argc --> %p\n", &argc );
    /* 6 */ (void) printf( "malloc --> %p\n", malloc(50) );
    /* 7 */ (void) printf( "a --> %p\n", &a );
    /* 8 */ (void) printf( "main --> %p\n", main );
    return 0;
}
```

This line number would print the smallest value

This line number would print the largest value

What question would you like to see on the Final Exam? (1 pt)