Name: _____

Directions: **Work only on this sheet** (on both sides, if needed); do not turn in any supplementary sheets of paper. There is actually plenty of room for your answers, as long as you organize yourself BEFORE starting writing.

1. (20) The statement

```
__asm__("addl $8,%eax");
```

would be mostly likely to appear amongst the code of what language?

2. (20) Fill in the blank: The term _____ refers to a set of parallel wires, to which the CPU and memory are attached.

3. (20) Fill in the blanks: In the instruction on line 50, p.73, the source and destination operands are specified in _____ and _____ modes, respectively.

4. I had a certain assembly language source file **trymovs.s**, which I assembled, linked and fed into GDB. I set one breakpoint, and ran the program. At the breakpoint, I queried the contents of the registers. Here is what my GDB session looked like at that point:

```
(gdb) break 14
Breakpoint 1 at 0x8048092: file trymovs.s, line 14.
(gdb) r
Starting program: ...
Breakpoint 1, _start () at trymovs.s:14
14            rep movsb
Current language:  auto; currently asm
(gdb) info registers
eax            0x8888        34952
ecx            0x888888        8947848
edx            0x8888888        143165576
ebx            0x88888        559240
esp            0xbfc3e230        0xbfc3e230
ebp            0x0        0x0
esi            0x8049094        134516884
edi            0x804909a        134516890
eip            0x8048092        0x8048092 <_start+30>
eflags         0x292        [ AF SF IF ]
cs             0x73        115
ss             0x7b        123
ds             0x7b        123
es             0x7b        123
fs             0x0        0
gs             0x0        0
```

Note that the second and third columns show register contents, in hex and decimal.

(a) (15) How many bytes will be copied?

(b) (15) Now resuming execution, what is the first value to go onto the address bus? (This is *execution*, not counting instruction fetch.)

5. (10) The R language allows one to interface with C code in the following way. One writes a C function, say **cftn()** in C, then compiles it into a library. Then, while running R, one calls the R function **dyn.load()**, with the argument being the library file. One can then call **cftn()** from R. On Linux, what suffix will that file name have?

Solutions:

1. C++ (Sec. 3.14)

2. *bus* (p.44)

3. immediate, register (Sec. 3.7)

4a. c(ECX) = 8947848 (p.99)

4b. c(ESI) = 0x8049094 (p.99, p.44)

5. .so (p.95)