

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. Consider the GDB output at the top of p.149. Answer the following questions about line 15:

- (a) (10) Which of the four numbers is an address?
- (b) (10) What kind of address is your answer in (a)?
 - (i) Physical address. (ii) Virtual address. (iii) Page number. (iv) Offset. (v) Stack position. (vi) I/O port number. (vii) None of these.

2. (20) Suppose we are running a program on CSIF. It seems slow to us, and we suspect that this may be due to excessive cache misses or page faults. Fill in the blanks: Using material from our course, we can determine the number of _____ using the _____ command, but we cannot determine the number of _____. Of these two numbers the one that causes more slowdown is _____.

3. (10) Consider the code on p.231. What is the slot number for **z**?

4. (25) In the example on p.199, give a numerical expression for the offset-within-page of **q[0]**.

5. (25) I changed the function **Min()** on p.225 to:

```
public static int gy(int U, int V)
{ int T;
  -----
  -----
  -----
}
```

This produced the code

```
public static int gy(int, int);
Code:
0:      iload_0
1:      iconst_3
2:      iadd
3:      iload_1
4:      if_icmpge      14
7:      iload_0
8:      iconst_3
9:      iadd
10:     istore_2
11:     goto      18
14:     iload_1
15:     iconst_3
16:     iadd
17:     istore_2
18:     iload_2
19:     ireturn
}
```

Fill in the blanks above.

Solutions:

1a. Not graded.

1b. (ii)

2. page faults, time, cache misses, page faults

3. 3

4. $0x7bf4-1999 \times 4$

5.

```
if (U+3 < V) T = U+3;
else T = V+3;
return T;
```