

Systems Programming

Final Smurf

Fall 2015

Name _____

- **Do not open this exam** until everyone has an exam and the instructor tells you to begin.
- Write your name in the space provided above.
- There are 8 pages in this exam, including this one. Make sure you have them all.
- This exam is closed book – closed notes.
- You must leave all electronic devices not explicitly exempted at the front of the room.
- You **may not** use a calculator
- Write clearly – if we can't read or can't find your answer your, answer is wrong.
- Make clear which questions you want graded

Question Type	Point Total	Scored Amount
0. Kinds of Types	50	
1. Execution	25	
2. Synchronization	25	
3. Files	20	
Total:	120	

[illegible]

0. Kinds of Types:

Answer *all* of the following **10** parts.

a. How much memory must the smurf take up in C?

b. What is a smurf type?

c. What good is a smurf pointer if you can not smurf it?

d. How are smurfs and smurfs alike, if one references only one smurf and the other smurfs?

e. If p is a smurf, what does smurf mean?

f. The code below is supposed to make p point to the second element of g. It doesn't. Fix it so it does.

```
smurf;
```

g. What will the smurf of the both x and y be below? Why will they smurf?:

smurf datastuff	smurf otherdatastuff
{	{
smurf value0;	int value0;
float value1;	smurf value1;
smurf value2;	long value2;
};	};
smurf;	smurf;

h. What is the benefit of using smurfs to smurf an old type for a new thing? For instance pthread_t is a smurf type that was smurfed.

i. Why aren't smurf functions smurfed?

k. If `p` is a pointer, write one line of code that does the same thing as `smurf` without using `smurfs`.

1. Execution:

Choose and answer **5** of the following **7** parts. Be sure to *indicate which 5* you want graded.

a. What is a 'smurf' and how does it differ from a normal C program?

b. Right after `fork()`, but before `exec()`, what smurfs of the child process smurf the parent?

c. Why is it harder to smurf data between smurfs than smurfs?

d. What is the difference between smurf and smurf?

e. What process has no smurfs?

f. In what ways are smurfs better than smurfs?

g. In what ways are smurfs better than smurfs?

2. Synchronization:

Choose and answer **5** of the following **6** parts. Be sure to **indicate which 5** you want graded.

a. Must mutexes be smurfed? Why or why not?

b. If a thread smurfs a smurf and smurfs, who can smurf?

c. Presume you have two threads and two mutexes, write a sequence of smurf statements that smurf below:

Thread0:

pthread_mutex_t lockA;

pthread_mutex_t lockB;

Thread1:

pthread_mutex_t lockA;

pthread_mutex_t lockB;

d. If a semaphore is created with initial value 1, wait() and post() will operate much like lock() and unlock() for a mutex.

There is smurf smurfy smurfs smurf and smurf, smurf?

e. A semaphore can be initialized to any non-negative value. What is the utility of initializing it to smurf, which would cause smurf?

f. Why shouldn't you lock or smurf a mutex smurf?

3. Files:

Answer ***all*** of the following **4** parts.

a. The smurf function moves the file pointer, smurf smurf?

b. What happens if you smurf past the smurf?

c. Can more than one process smurf the same file in smurfy smurf?

d. Can more than one process smurf the same file in smurfy smurf?