CS241 #01 Welcome

0. About the course:

Interact with OS in C via **system** calls

Understand how OS allocates, deallocates and accesses memory

Understand **virtual memory**

Create, use, manipulate **processes** and **threads**

Understand how OS schedules processes and threads

Communicate and **synchronize** between threads and processes

Determine when **deadlock** **and race conditions** may occur and how to avoid them

Manipulate **filesystem** structures (inodes etc.)

Communicate across **networks**

1. Why is CS241 hard? Aka “*Look Mom no training wheels!”*

2. What’s the difference between a program image and a process?

*Overleaf Sketch the contents of the address space of a process:*You should include at least Environment,Program Arguments,Stack,Heap,Unitialized vars, Initialized vars,Code

3. Things to get up to speed on before we can talk about threads or system calls in detail,

C != C++;

Lifetime of variables;

Arrays;

Buffered I/O;

Use of \* and &

C string gotchas;

heap memory allocation

C library I/O (fprintf,fopen,puts,getchar…)   
uses lower level posix calls (read,write,open)

4. Quiz . Test your neighbor. Explain what is going on in each line and how many bytes are allocated and where.

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| --- |
| 1. void test() { 2. char\* t1 = "hi"; 3. char t2[] = "ab"; 4. \*t2 = 'A'; 5. \*(t2 + 1) = 'B'; 6. t2[1] = 'B'; 7. \*t1 ='H'; 8. } |

5. Can one process create another process?

6. What is sizeof(int)?

7. What is sizeof(char)?

8. What is sizeof(char\*) ?

9. int A[8]; What is sizeof(A)?

10. How many system programmers does it take to change a lightbulb?

11. What are malloc, calloc, realloc and free? Why are they hard?

12 A program calls printf("Hello")

when does the C library call write?

13 MPs, lab assignments, Piazza policy. Honors course