FINAL REVIEW

Problem Solving with Computers-I

Final Exam!

- Final exam page: https://ucsb-cs16.github.io/f19/exam/e03/
- Monday (12/9) noon to 3pm Embarcadero Hall
- Assigned seating, will be posted on Piazza
- Everything we have covered so far is on the exam
- Duration: **3 hours**
- Closed book: no calculators, no phones, no computers
- Only 1 sheet (***double***-sided is ok) of written notes
  - Must be no bigger than 8.5" x 11"
  - You have to turn it in with the exam

Review

- Coding practice (recursion + linked lists)
- Pointers
- Structs and Linked List

Take notes!

Recursion and linked list

- Given a linked list, implement each of the following:
  - Find the min value in the linked list
  - Delete all the nodes in the linked list
  - Delete the value of a single node in a linked list

Pointers

1. What C++ unary operator is the "de-referencing" operator?

2. What C++ unary operator is the "address-of" operator?

3. Declare a variable p to be a pointer to a pointer to a character

4. Draw a pointer diagram to show the evolution of data in memory during the execution of the the following code:

A.
```
int a=6, b=7, *p1=&b, *p2=&a;
p1 = p2;
*p1 = 8;
p2 = &b;
```

Draw pointer diagrams

B.

```
int a=2, b, *p1=&b, *p2=&a, *p3;
p3 = p2;
*p1 = 8;
p2 = p1;
p1 = p3;
*p2 = 4;
```

C.
```
int a=2, b=3, *p1, *p2;
p2 = &a;
p1 = &b;
*p1 = *p1 + *p2;
```

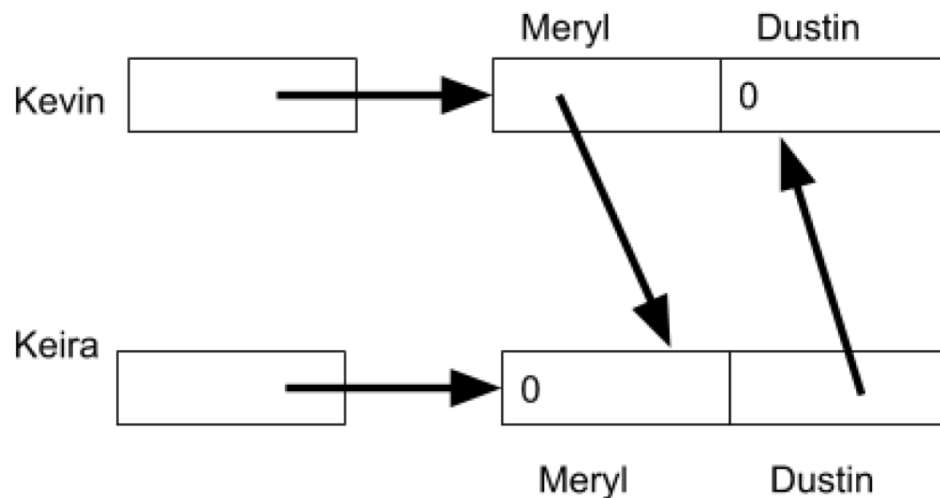# Draw pointer diagrams for the following code

(a) Draw a pointer diagram for the following code:

```
int*** p = new int**;

*p = new int*;

**p = new int;

***p = 5;
```

(b) Write code to print the values of all data created on the heap

Pointers and Structs

Starting with the current state of memory shown above, consider the C++ code shown below. In the space to the right, draw the state of memory after this code executes?

```
struct Actors{
    Actors* Meryl;
    Actors* Dustin;
};
Actors* Kevin;
Actors* Keira;
```

```
Kevin->Meryl = 0;
Kevin->Dustin = Keira;
Keria = Keira->Dustin;
```

Deleting the list

`int freeLinkedList(LinkedList * list){…}`

Which data objects are deleted by the statement: `delete list;`

list   head tail

(A)   (B)

1   2   3
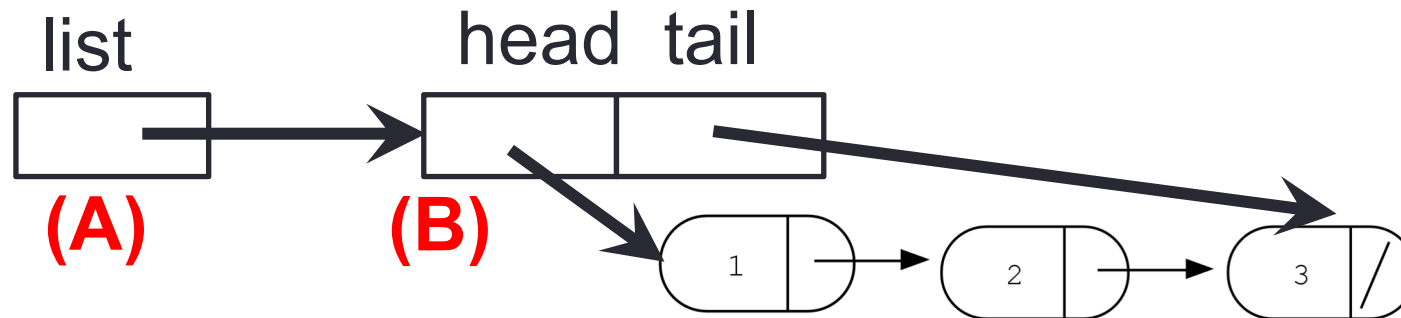
(C) All nodes of the linked list

(D) B and C
(E) All of the above

Does this result in a memory leak?

Some comic relief…

HTTP://XKCD.COM/1296/

Some comic relief

Good luck with the final!