Quiz 2 CSCI 431 Fall 2005
Open notes section
27 October, 2005

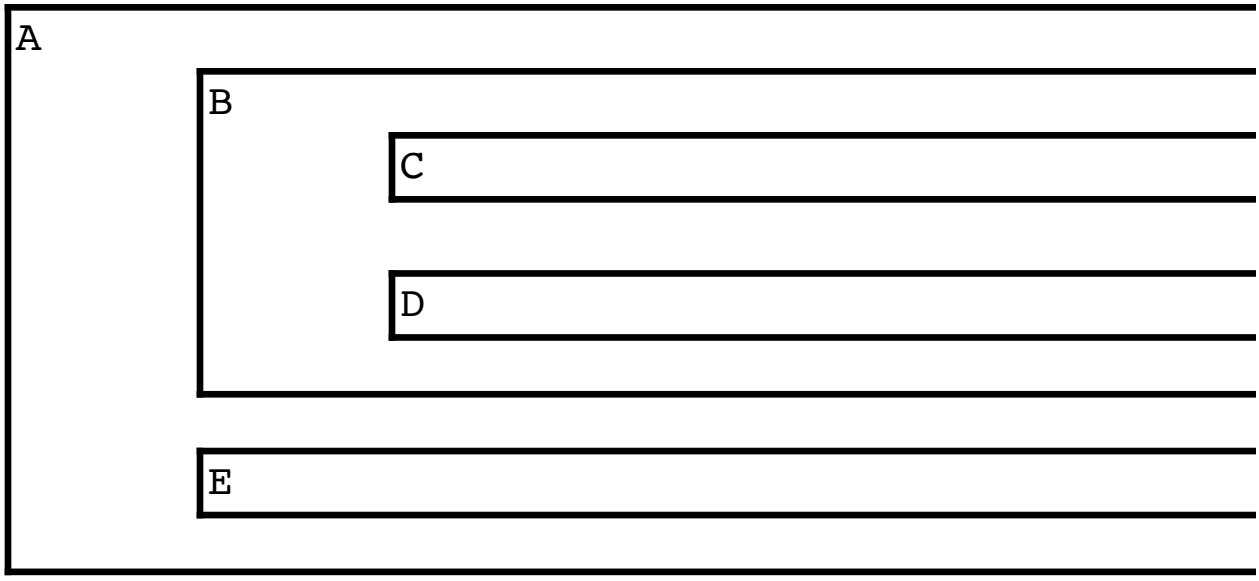
Name: _____
This is the open notes section of Quiz 2. This section must be turned in by 11:15 am.

Problem 1 (6 points)
Suppose a one-dimensional integer array in Pascal is declared with the dimensions `2..10`, that is, the index of the first element is `2` and the index of the last element is `10`. If the first element, `A[2]`, of the array is stored at memory location `0xc0000080`, give a formula for the location of `A[i]` in terms of the Pascal variable `i`. Assume that each integer is stored in four bytes.

Problem 2 (6 points)
It's been argued that object-oriented programming eliminates the need for type constructors such as the C `union` and Pascal variant `record`. How could this be?

Problem 3 (6 points)
What sort of programming errors can be eliminated by the use of run-time garbage collection?

Problem 4 (12 points)
The following diagram represents the scope of five procedures, many of which are nested in Pascal, a statically scoped language.



Problem 4A:
Which of these five procedures may be called by `D`?

Problem 4B:
Which of these five procedures may be called by `E`?

Problem 4C:
Suppose `A` calls `B` which (recursively) calls `B` which calls `C`. Draw the stack with the four activation records and their dynamic and static links as its exists when procedure C is being executed.

Problem 5 (6 points)
Give an example of a program that prints "UNCA" when executed with dynamic scoping but prints "WCU" when executed with static scoping. You may use the pseudo-code of your choice.

Problem 6 (8 points)
Write a Perl subroutine that when passed three variables returns the sum of the two largest. For example, if passed the values 5, 15, and 10, your subroutine should return 25 (15+10).

Here's a useful example in Java for local variables `x`, `y`, and `z`.

```
if (x+y > x+z && x+y > y+z)
     return x+y ;
if (x+z > y+z)
     return x+z ;
return y+z ;
```