

COSC 201 Review Questions  
Midterm #2  
Fall 2009

What are the four problems that need to be solved for the RSA encryption scheme?

Give me an algorithm to solve for the greatest common divisor between two ints.

Give three examples of what sorting would be useful for.

Given the sequence 45, 33, 12, 2, 19, 10, 8, 1, 9 ... show me how an insertion sort would sort this sequence.

Using the same sequence, show how shell sort, merge sort and quick sort would sort that sequence.

Give me three different ways to pick the pivot for quick sort and what are the advantages and disadvantages to each.

Explain the partitioning strategy used in the quicksort algorithm from the book.

What is the average running time complexity of the insertion sort, shell sort, merge sort and quick sort algorithms in the book?

What is the issue with the following solution to the Fibonacci problem?

```
public int fib(int a){  
    if (a == 0 | a == 1) return 1;  
  
    return (fib(a-1) + fib(a-2));  
}
```

What is the solution to the issue above?

Give a recursive method to print all permutations of a String s.

How can we determine if a number is prime? Write the code for your solution.

Declare and instantiate an Integer Queue in Java. Add the following numbers to the Queue: 1, 4, 22, -4, 3, 1. If we printed the Queue out in order, what would print?

Create a PriorityQueue of Strings. Add the following Strings to the queue: "Alan", "COSC 201", "Computer", "Science", "Schaefer", "SMCM". If we printed out this queue in order, what would print?