Objectives:

1. To review answers for the midterm.
2. To introduce the concept of Binary Search and illustrate examples.

Reading Assignment:

Neapolitan and Naimipour: Chapter 2.

Contents:

1. Review answers from exam. (1 hour)
2. Outline the steps of Binary Search. (1/2 hour)
3. Iterative Approach vs. Recursive Approach. (1/2 hour)
4. Outline Pseudocode for Recursive Approach. (1/2 hour)
5. Work through examples. (1/2 hour)
3. Review answers from exam.  
4. Outline the steps of Binary Search.  
   - if $x$ equals the middle item, then quit. Otherwise:
     a. Divide the array into two subarrays. If $x$ is smaller than the middle item, choose the left subarray. If $x$ is larger than the middle item, choose the right subarray.
     b. Conquer the subarray by determining whether $x$ is in that subarray. Unless the subarray is sufficiently small, use recursion to do this.
     c. Obtain the solution to the array from the solution to the subarray.

   - Demonstrate Iterative Approach.
   - Demonstrate Recursive Approach.
   - Discuss pros and cons of both.

   
   ```c
   index location(index low, index high)
   {
       index mid;
       if (low>high)
           return 0;
       else
       {
           mid = [(low + high)/2];
           if (x == S[mid])
               return mid;
           else if (x < S[mid])
               return location(low, mid - 1);
           else
               return location(mid + 1, high);
       }
   }
   ```

5. Work through examples.  
   
   $x = 18$
   
   array = 10, 12, 13, 14, 18, 20, 25, 27, 30, 35, 40, 45, 47
Handouts, etc. for Lecture: None.