

8: Recursive Binary Search

CSCI 2212 Fall 2015

1 Goals and Overview

- To learn binary search and implement a simple recursive program.
- To use file input.
- To use random numbers.

This is a 2-part assignment. The input file is the list of potential winners generated by Program 7. In this program, you will read the file of lucky numbers and use the data to decide which users get prizes and which do not.

The random numbers will all be in the range 0 to 999, and will represent the last three digits of a student's ID number. Each week, fifty random numbers will be generated and written out to a file that will be used every day that week. Ten lucky students will get prizes each week.

Students will run the program once a week to find out whether they have won anything in the big holiday prize give-away. The program will prompt for the last 3 digits of the student's ID number. If it matches one of the fifty random numbers selected for that week, the program will announce that the student has won a prize. If there is no match, the program will print a sympathetic message about not being a winner.

2 Instructions

Input files. Use the file of 50 lucky numbers produced by Program 7. In addition, prepare an input file that lists ten prizes, one per line. Let some prizes be really good and others so-so. The description of a prize could be several words and could include almost any ASCII character.

Preparation. Print a greeting message. Read the file of 50 lucky numbers into an array. Read the list of 10 prizes into another array.

Awarding Prizes. In a loop that goes 10 times, once for each of 10 prizes:

- Prompt the user to enter the last three digits of his or her ID number.
- Perform a recursive binary search of the lucky numbers and, win or lose, print an appropriate message.
- For winners, also select and print the prize, according to this method:
 - Use a random number to select one of the remaining prizes and print a message telling the user what prize was awarded.
 - Then swap the prize you used with the unused prize at the end of the list. This is like shuffling prizes.
 - Keep track of how many prizes are left; decrement the counter when you award a prize.
- When all the prizes for the week are used up, display the bad news and do not prompt for an ID number.

Prizes and messages. Be creative. Make up your own prizes and your own positive and negative messages. Hand in the program, your two input files, and a copy of the screen output. Please do not hand in screen shots. Use your mouse to copy the screen and paste it into an ordinary text file (not .doc).