Solutions for Written Assignment 3

Michael Haungs

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1 Review Question 12.4 (8 points)

In English, the linear search algorithm is:

From beginning to end, sequentially compare each member of a data list with the target value until a match is found or the end of the list is reached.

In English, the binary search algorithm is:

Choose an item near the center of a sorted data list and compare it with the target value. If the data item is a match then you're done, otherwise determine which half of the sorted list the target values resides. Repeat search for this half of the list.

2 Review Question 12.7 (6 points)

"When you apply the selection sort algorithm, you put the array into its final order one element at a time. In the first step, you find the smallest element in the entire list and put it where it belongs – at the beginning. In the second step, you find the smallest remaining element and put it in the second position. If you continue this process for the entire array, the final result is in sorted order."

3 Review Question 13.6 (8 points)

1. dp1 = &d1;
2. dp2 = &d2;
3. *dp1 = 3.14159;
4. d2 = 2.71828;
5. dp1 = dp2;
6. *dp1 -= d2;

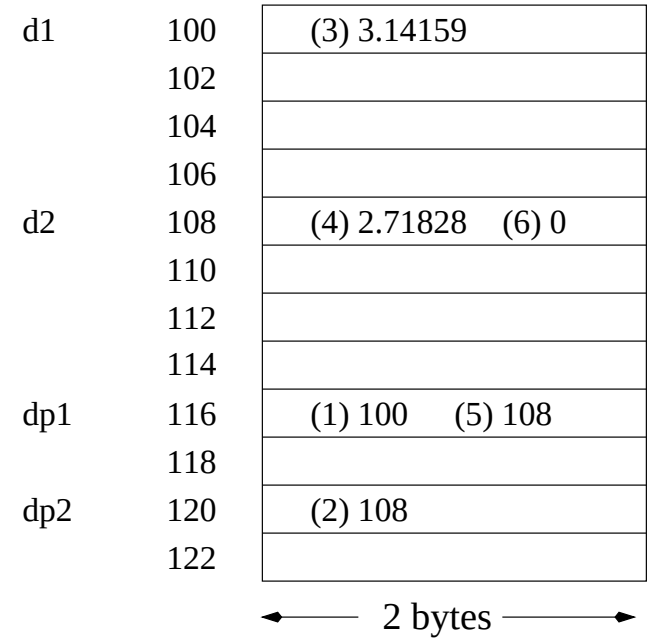

Figure 1: The stack frame and trace through the operations.

4 Review Question 13.11 (4 points)

Call-by-Reference This is when you declare the parameter value of a function as a pointer type and then pass the address of the argument to the function and not the copied value (which is pass-by-value).

5 Review Question 15.1 (4 points)

(b) a one-dimensional sequence of characters.

6 Review Question 15.12 (4 points)

The purpose of the *ungetc* function is to "push" the character back into the input stream so that it is returned on the next call to *getc*.

7 Review Question 16.8 (6 points)

Bob Cratchit's salary: staff[1].salary
Ebenezer Scrooge's first initial: staff[0].name[0]

8 Review Question 16.14 (8 points)

Why are both representations necessary?

Both representations are necessary because you need to provide a representation that is easy for the programmer to use (internal) and you need to provide a representation that is acceptable for permanent storage and user manipulation (external).

What factors must you consider in the design of each one?

Internal Factors

- encapsulation
- ease of use in program
- data types
- storage and efficiency

External Factors

- easy to read into the program
- easy to manipulate (even for non-programmers)

9 Review Question 17.1 (6 points)

Recursion It is a strategy defined as any solution technique in which large problems are solved by reducing them to smaller problems of the same form.

10 Review Question 17.7 (4 points)

enqueue, dequeue

11 Review Question 17.13 (6 points)

The complexity of binary search is: $log_2 N$ where N is the number of values.