CSCI 3333 Homework: Lists

1 List Syntax

Problem 1. Write a declaration of a vector of floats named V.

Problem 2. Write a declaration of a vector of float pointers named P.

Problem 3. Write a declaration of a vector of a vector of floats named VV.

Problem 4. Write a C++ code snippet that creates a vector named ABC containing the elements "easy", "as", "1,2,3" (in that order).

2 Using Lists

Problem 5. Write a C++ function named print_all that takes a vector<string> named A and returns nothing. The function should print the elements of the vector, one per line.

Problem 6. (Based on Book Exercise 3.5) Write a C++ function named union that takes two vector<float>s named A and B and returns a vector<float>. The returned vector should contain the union of the elements in A a B (i.e., contains exactly the elements in A and B with no duplicates).

Problem 7. (Based on Book Exercise 3.1) Write a C++ function named print_indices that takes two vector<int>s named A and I and returns nothing. The function should print the elements of A, one per line, at the valid indices in I (elements in I less than 0 and greater than A.size()-1 can be ignored). The elements may be printed in any order.

3 List Asymptotics

Problem 8. Give the worst-case running times of the following operations of a dynamic-array-based (e.g., C++ STL’s vector) list containing n elements.

- Adding an element:
  - To the back.
  - To the front.
  - To the middle.

- Removing an element:
  - From the back.
  - From the front.
  - From the middle.
• Accessing an element:
  – At the back.
  – At the front.
  – At the middle.

Problem 9. Give the worst-case running times of the following operations of a doubly-linked-list-based (e.g., C++ STL list) list containing $n$ elements.

  • Adding an element:
    – To the back.
    – To the front.
    – To the middle.

  • Removing an element:
    – From the back.
    – From the front.
    – From the middle.

  • Accessing an element:
    – At the back.
    – At the front.
    – In the middle.

Problem 10. Analyze the running time of the `union` function you wrote for Problem 6.

Problem 11. Analyze the running time of the `print_indices` function you wrote for Problem 7.