

ECE 218

Second Test

10th November 2021

Who are you?

What is your C number?

Sign the honour pledge:

Do not write in these boxes

Question	Out of	Your score
5	33	
6	33	
7	33	
8	1	

Question 5: Vectors

You are going to be storing information on a lot of items sold by a supermarket.

You are to store them in a vector that you code yourself.

Do not `#include <vector>`, define the vector class yourself.

For each item, the following pieces of information will be stored:
description, number in stock, price each, and UPC (bar code).

- A. Define a struct, with a constructor and print method, suitable for representing an item.
- B. Define a class, using public and protected in an appropriate way, to represent a vector of items. It should have a constructor and a method for adding a new item.
- C. Write a method that returns as its result the total value of all items in the supermarket.

Question 6: Fast Sorting

A person is to be represented by a struct containing their name, address, and phone number.

The array A contains N pointers to person objects.

Give C++ code that would sort that array (so that their names are in alphabetical order) in time proportional to $N \cdot \log_2(N)$

Question 7: Linked Lists

A person is to be represented by a struct containing their name, address, and phone number.

This question is about a linked list of persons.

- A. Define the structs or classes required to represent a linked list of persons, give each a constructor.
- B. Write a function or method that adds a person to the front of an existing linked list.
- C. Write a function or method that adds a person to the end of an existing linked list.
- D. Write a function or method that finds and removes the person from the linked list whose name comes first in alphabetical ordering.
- E. Use your existing work to write a function or method that sorts a whole linked list of persons.

Question 8: Multivariate Calculus

Draw a picture of a cat sitting on a chair.