CSc10300 - Assignment 4

Object and Classes/ Pointers/ Streams - Spring 2021

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1

Create a class named Line:

(a) Define private data members p1 and p2 as pointer to Point objects (the one we had in lectures), slope and length as double variables.

(b) Define setter and getter functions.

(c) Define a default constructor that allocate dynamic memory for points and set everything to 0.

(d) Overload a constructor that allocates memory for points, initilize them with given arguments, and calculate the slope and length.

(e) Overload destructor, copy constructor and copy assignment operator.

(f) Create a function called "parallel" that takes too Line objects, returns true when given lines are parallel and returns false otherwise.

(g) Overload the less than (<) and greater than (>) and equality (==) operators (compare the length).

(h) Write a functions that reads lines in the format provided in the lines.txt from the file (**without any change**) and stores them in a vector named Lines.

(i) Sort the objects of Lines vector in ascending order using sort algorithm.

(j) Extend the functionality of cin and cout for this class

(k) Extensively test your code as you learned in unit testing lessens.

You should be able to decide where to define each of these functions based on what you have learned so far.

2

Assume the Product structure is declared as follows:

```
struct Product
{
    string description;  // Product description
    int partNum;         // Part number
    double cost;         // Product cost
};
```

(a) Add two constructors to the Product structure declaration. The first should be a default constructor that sets the description member to the null string and the partNum and cost members to zero. The second constructor should have three parameters: a string, an int, and a double. It should copy the values of the arguments into the description, partNum, and cost members.

(b) Define a print function as member of the struct that prints an object of this struct in the following format.
Description: Claw Hammer Part
Number: 547
Part Cost: $8.29

(c) Declare a dynamic array of Products of size 5 and name it "items". Initilize it with user input values.

(d) Write a print function (not as a member of the struct) and pass a pointer to the pointer that points to the array (double pointer) and print all the items of the array.

(e) Define a max function (not as a member of the struct) that gets an array of items as an input and returns a pointer to the max element of the array.

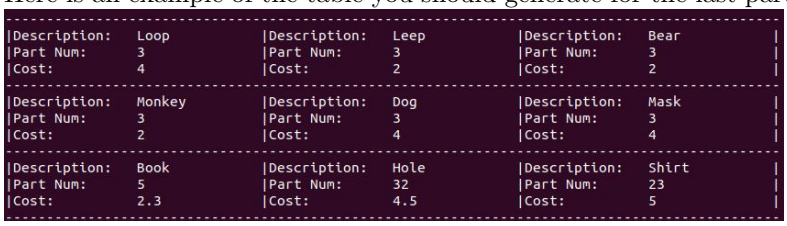
(f) Declare a 3 by 3 two dimensional **dynamic array** and populate it.

(g) Overload an output function that takes a stream object and a pointer to a 2D array as arguments and outputs data members of objects in format of 3*3 table into the given stream. Test your function both with and output file stream and cout stream.

(h) Write a testbench to test your program properly.

Submission:

1. Here is an example of the table you should generate for the last part of h.



Description:	Loop	Description:	Leep	Description:	Bear
Part Num:	3	Part Num:	3	Part Num:	3
Cost:	4	Cost:	2	Cost:	2
Description:	Monkey	Description:	Dog	Description:	Mask
Part Num:	3	Part Num:	3	Part Num:	3
Cost:	2	Cost:	4	Cost:	4
Description:	Book	Description:	Hole	Description:	Shirt
Part Num:	5	Part Num:	32	Part Num:	23
Cost:	2.3	Cost:	4.5	Cost:	5

2. In your unit testing, test the steps of the problem in order.