I STARTED THE DAY WITH LOTS OF PROBLEMS.

BUT NOW, AFTER HOURS AND HOURS OF WORK, I HAVE LOTS OF PROBLEMS IN A *SPREADSHEET*.

Lab 6 - Container ADTs

ReadMe

Reminders

- Lab 6 due Sunday, October 28th at 8pm
- Project 3 due TONIGHT at 8pm
- Review session - Sunday October 28th, 4pm in CHRYS 220
- Exam - Wednesday October 31st (Halloween!) at 7pm

Agenda

15 - Container ADTs + Worksheet

5 - Employee statistics

40 - Exam practice

50 - Lab time & questions

Review: ADTs

ADTs are Abstract Data Types.

ADTs bind functions & data into a type/class that exposes an interface.

ADTs allow us to abstract the world around us

Useful properties to remember:

Abstraction, Encapsulation, Information Hiding.

Containers

Containers are a special type of ADT often used in computer science

A Container is an ADT that stores other ADTs.

Gives us a way to reason about multiples of ADTs.

Computer Scientists like working with things at scale: Think about our Fruit ADT. How do you write a program to deal with millions or billions of Fruits (watermelons, apples, oranges, pears, grapes, etc.)?

Can you think of some important features you'd want a container to have?

Containers

You will often see containers support the following operations:

Add an element

Remove an element

Check size of the container/ see if it's empty

"Special" features:

Access a particular element, search, sort, remove particular element

What are these operations for a vector?

Let's look it up!

Google vector C++

All Videos Images Books News More   Settings Tools

About 51,000,000 results (0.69 seconds)

vector - C++ Reference - Cplusplus.com
www.cplusplus.com/reference/vector/vector/ ▾
Instead, **vector** containers may allocate some extra storage to accommodate for possible growth, and
thus the container may have an actual capacity greater ...

Vector
Std::vector - Assign - Push_back -
Vector::back - Operator - Vector

Insert
The vector is extended by inserting
new elements before the ...

Erase
Removes from the vector either a
single element (position) or a ...

Vector::size
Returns the number of elements in
the vector. This is the number of ...

Push_back
Adds a new element at the end of the
vector, after its current last ...

Begin
Returns an iterator pointing to the first
element in the vector ...

More results from cplusplus.com »

std::vector - cppreference.com
en.cppreference.com/w/cpp/container/vector ▾
Oct 15, 2017 - The elements are stored contiguously, which means that elements can be accessed not
only through iterators, but also using offsets to regular ...
Template parameters · Iterator invalidation · Member types · Member functions

Polymorphism and Containers

```
class Fruit {
    …
}
```

```
class Banana : public Fruit
{
    …
}
```

```
class Watermelon : public Fruit
{
    …
}
```

```
class Apple: public Fruit
{
    …
}
```

```
Banana banana1();
Banana banana2();
Watermelon watermelon1();
Apple apple1();

Fruit* groceries[4] = {&banana1, &banana2, &watermelon1, &apple1};

for(int i = 0; i < 4; ++i) {
    groceries[i]->eat();
    //we automatically call the right "eat" function!
}
```

Worksheet!

Remember the Employee ADTs?

- We have some statistics about the employees we made!
- We take these statistics every term to open a dialogue about DEI in EECS
- What causes results like this? What can we do about it?
- TED talk by Yassmin Abdel-Magied
  - Her main point: everyone has unconscious biases. She proposes that we could improve this situation by mentoring someone different from ourselves.
  - Speaking of this…
    - How to be an EECS IA Panel!
    - Co-hosted by GEECS & Computing Cares
    - October 29th from 7:30pm - 8:30pm in BBB 1690

Midterm Topics to Review:

Lectures 1-10 are covered
Procedural Abstraction & Call Stack
Pointers and Arrays
String Streams & IO
Compound Objects
C style ADTs
C++ style ADTs
Inheritance
Polymorphism

My personal advice:

*Go through all of the lecture slides/ redo examples

*Make your cheat sheet as you go

*Redo lab activities & glance at projects