Announcements

- Lab tomorrow
- HW1 due Friday
- HW2 due Thursday

1. Read section 1.5 of text
Different types of variables

- Reference
- Value
- Pointer
Changes inside function persist.

Every input parameter to a function.

Use mainly to avoid redefinition copying.

Why?

Creates alias for a variable.

\begin{verbatim}
int a(3);
int b = a;
\end{verbatim}

Reference
But d is not a Point! Can't say a = 6

\[ \begin{array}{c}
{\text{d : Point}}
\end{array} \]
d > get(x);

& (x);

* (d), get (x);

a pointers:

Using pointer variables
null pointer. You do allow passing by reference.

This is similar to passing by reference.

```cpp
bool isOrigin(Point p) {
    return p.x == 0 && p.y == 0;
}

Point *p = NULL
```
Garbage collection - analogous in Python, not in C++.

Point()

The

numberOfPoints(); no return.

className(); no arguments, no return.

Must create a destructor.

If your class opens files or allocates

Destroyers.
What does this do? Shallow copy

\[
\text{Vector} a = (100) \neq \text{Vector} b = (99, 98, \ldots, 1) \]

Previously:

Point \( a \)

Consider the following:

Copy Constructors:
To fix, write our own copy constructor:

```cpp
 Vect b(a);

// copy constructor
 Vect (const Vect &a) {
    vectSize = a.vectSize;  // copy size
    theVect = new int[vectSize];
    for (int i = 0; i < vectSize; i++)
        theVect[i] = a.theVect[i];
}
```
Write a function to make deep copy of data.

```
c. the vect = a. the vect;
c. vect2.size = a. vect2.size;
by default, copies each parameter
What does this do? Shallow copy?
```

Another Problem:
Charge (money)
Accessors for all above (see code?)

Methods?

- Interest rate
- Security code
- Company name
- Expiration date
- Current balance
- Name of owner
- Limit

What is? (private / public?)

Example program - Credit Card Class