C++ Crash Course

Module 5: File Input/Output and Pointers

Human Computer Interaction
IOWA STATE UNIVERSITY
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File Input/Output and Pointers

- File IO with <fstream>
- Pointers
- Reference operator (&)
- Dereference operator (*)
- Dynamic memory allocation

File Input/Output

- Using <fstream> you can read information from an existing file and write to a new file or append an existing file.

- You must first create/open the file in your code.
  - ifstream file_to_read(“inputdata.txt”);
  - ofstream file_to_write(“outputdata.txt”);
  - ofstream file_to_append(“appenddata.txt”, ios::app);

File Input/Output

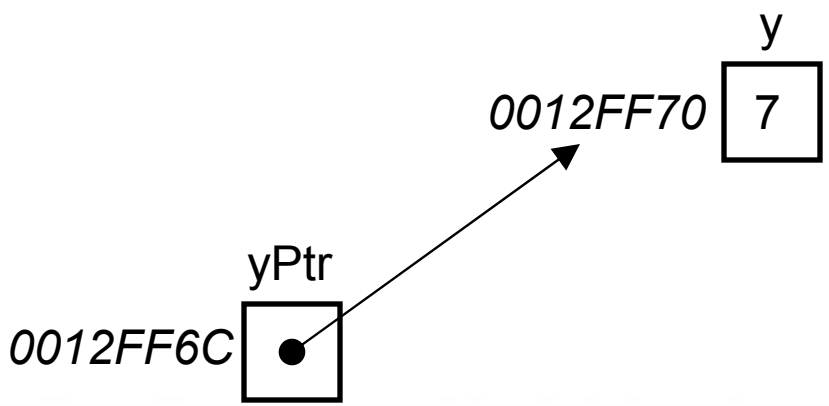
- Reading/writing is similar to cin/cout.
  - string str;
    file_to_read >> str;
    getline(file_to_read, str);
  - file_to_write << “One line of text”;
- Always close the file when you’re done.
  - file_to_write.close();
- See fileIO.cpp for example code.

Pointers

- In a word…confusing, at first anyway.
- The basic idea: a pointer is a variable that holds the memory location of another variable.

```
int y = 7;
int *yPtr;

yPtr = &y;
```



Pointers

- Reference operator - &
  - Meaning: “the address of”
- Dereference operator - *
  - Meaning: “the value of”
  - * is also used in declaring a pointer.

Dynamic Memory Allocation

- Instead of needing a pointer and a variable to reference, we can now allocate memory without declaring a separate variable.

- Introducing the new keyword.
  - new allows us to allocate and use a different kind of memory

Dynamic Memory Allocation

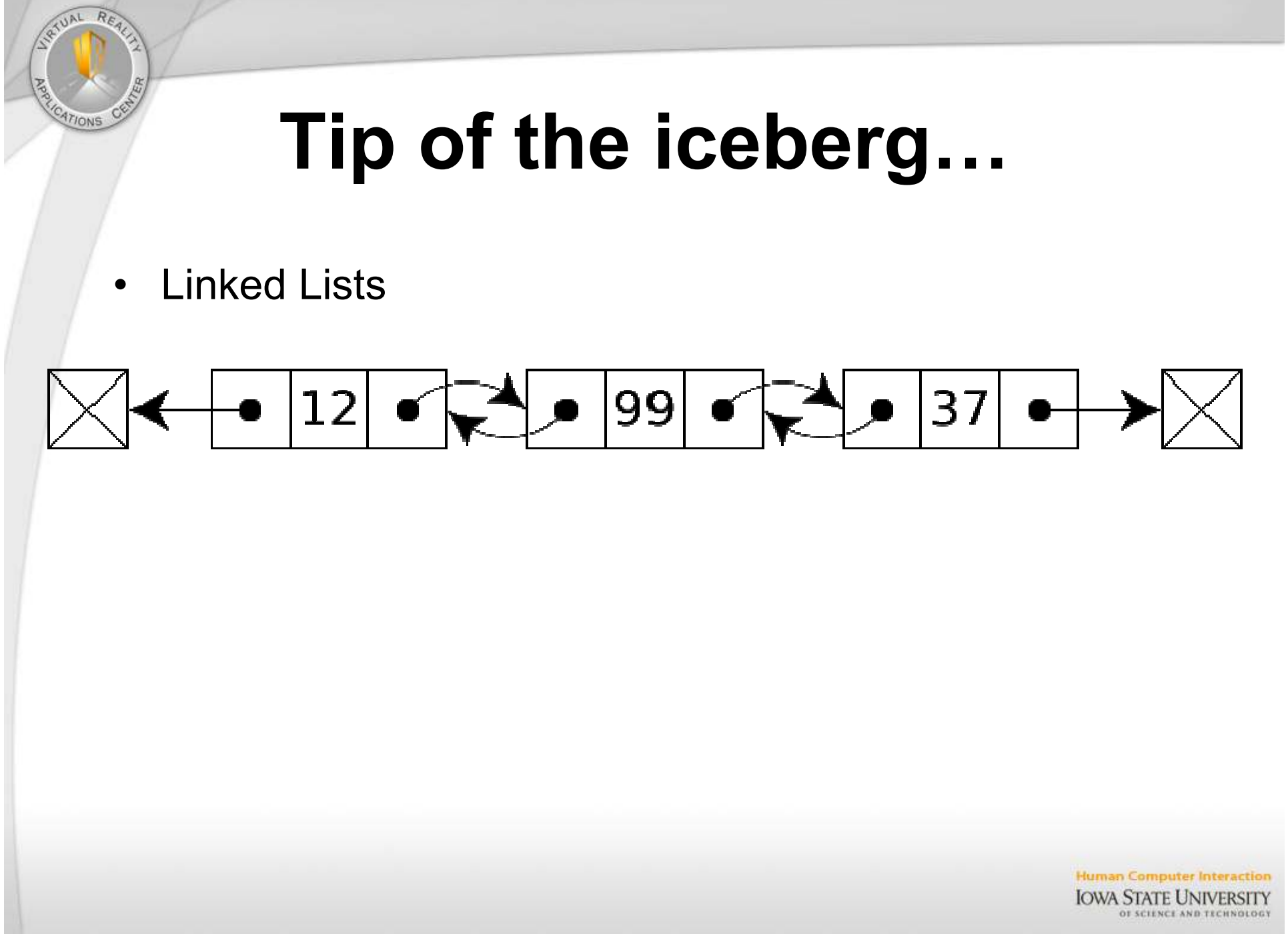
- Stack memory
  - Everything we've done previously has been part of the stack memory.
  - Allocation is done when the code is built.

- Heap memory
  - Accessible by pointers.
  - Can be allocated during runtime.

Dynamic Memory Allocation

- Parking lot analogy

Code	Parking Lot
int *PLptr;	Requesting a permit from parking services
PLptr = new int;	Being assigned space E42 in lot 60
*PLptr = 4;	Parking a car in the assigned space



Tip of the iceberg…

- Linked Lists

Tip of the iceberg…

- Practice, practice, practice
- pointers.cpp for a few examples
- Internet resources
  - http://www.codersource.net/c++_dynamic_memory_allocation.aspx
  - http://www.codeproject.com/cpp/pointers.asp
  - http://www.cplusplus.com/doc/tutorial/pointers.html