

Memory Management

Only the idea needed for the course

Importance of Memory Management

- The two views

Memory management is so important it must be handled by the **programmer**

Memory management is so important it must be handled by the **system**

Programmer Memory Management

- C / C++ expect the programmer to
 - » **allocate memory**
 - » **keep track of memory**
 - » **deallocate when memory is no longer needed**
- Rationale
 - » **Efficiency**
 - > **Only the programmer knows exactly when memory is not needed**
 - > **Only the programmer knows the best time to deallocate the memory**
- Problem – memory leaks – a notoriously difficult problem
 - » **Netscape on all systems !**

Dynamic Memory Management

- Lisp, Smalltalk, Java, Eiffel and ...
- System keeps track of memory
- Automatically recycles unused memory
 - » **garbage collection**
- No memory leaks
- Can have performance problems if garbage collection interferes with cpu task allocation
 - » **With good system can turn it on and off to avoid the critical cases**