conclusion

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Today

big ideas
➢ 6.005 in 5 minutes

project 3 awards

what next?

6.005 quiz game

HKN evaluations
3 IDEAS: PERSONAL FAVORITES
structural correspondence

idea
➢ make code structure isomorphic to structure of stream

benefits
➢ cleaner and more maintainable code with fewer bugs
➢ automatic code generation possible

follow up:
how to mess it up

```c
/* force next char to be different */
prevChar = EOF;
count = 0;
/* read input until there's nothing left */
while ((currChar = fgetc(fpIn)) != EOF)
{
    fputc(currChar, fpOut);

    /* check for run */
    if (currChar == prevChar)
    {
        /* we have a run. count run length */
        count = 0;
        while ((currChar = fgetc(fpIn)) != EOF)
        {
            if (currChar == prevChar)
            {
                count++;
            }
            else
            {
                /* run ended */
                fputc(count, fpOut);
                fputc(currChar, fpOut);
                prevChar = currChar;
                break;
            }
        }
    }
    else
    {
        /* no run */
    }
}
if (currChar == EOF)
{
    /* run ended because of EOF */
    fputc(count, fpOut);
    break;
}
prevChar = currChar;
}
```

from: [http://michael.dipperstein.com/rle](http://michael.dipperstein.com/rle)
#include <stdio.h>
#include <stdlib.h>

int main(int argc, char *argv[])
{
    int c;

    c = getchar();
    while (c != EOF) {
        int count = 1;
        int first_byte = c;
        c = getchar();
        while (c != EOF && c == first_byte && count < 255) {
            count++;
            c = getchar();
        }
        putchar(first_byte);
        putchar(count);
    }
    return EXIT_SUCCESS;
}
rep invariant

idea
- rep invariant characterizes well formed object representation

benefits
- articulate: in design
- document: for readability and to avoid bug introduction
- protect: no ‘rep exposure’
- check: with assertion, for more effective testing

follow up:
public class PriorityQueue<E> extends AbstractQueue<E> implements java.io.Serializable {

/**
 * Priority queue represented as a balanced binary heap: the two children
 * of queue[n] are queue[2*n] and queue[2*n + 1]. The priority queue is
 * ordered by comparator, or by the elements' natural ordering, if
 * comparator is null: For each node n in the heap and each descendant d
 * of n, n <= d.
 *
 * The element with the lowest value is in queue[1], assuming the queue is
 * nonempty. (A one-based array is used in preference to the traditional
 * zero-based array to simplify parent and child calculations.)
 *
 * queue.length must be >= 2, even if size == 0.
 */
private transient Object[] queue;
global, abstract object models

idea
- model application state with sets and relations
- no implementation details: just what user sees
- can take bird’s eye view, across distributed system

benefits
- to engineer: cleaner design, help think out of box
- to user: simpler conceptual model

follow up
example: replication

MODULE Replication [ Value, State ]
TYPE Action = State -> (Value, State)
VAR state: State, pending: set Action

ACTION
Do(a: Action) -> Value {
    (v, s) = a(state); state := s; return v;
    OR pending := pending U {a}; throw FAILED
}

THREAD
DoPending() =
    while true do {
        pick a in pending;
        (v, s) = a(state); state := s;
    }

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What to Do Next

Fall
- 6.172 Performance Engineering of Software Systems
- 6.820 Foundations of Program Analysis
- 6.814 Database Systems

IAP
- 6.088 Introduction to C/C++
- 6.370: The BattleCode Programming Competition
- 6.470 Web Programming Competition

Spring
- 6.035 Computer Language Engineering
- 6.813 User Interface Design and Implementation
PROJECT 3 AWARDS
Best feature

- Radhika Malik
- Hilary Monaco
- Bayo Olatunji
Start
Run Main.java in the Main Package

Choose to work as a client or a host.

And Click Connect
Working Offline

A user does not have to connect to the server right away. He may chose to “Work Offline” and then “Start Hosting” if editing as a host or “Connect” if editing as a client.

– If the host started working offline, when he starts hosting, the document he currently has is the hosting document.
Begin Your Document – With STYLE

Welcome to HRB Collab Editor!

Create your documents in Style!

Make your message stand out!

You can has copy/paste/paste/paste/paste/paste/paste/

*cut has been cut out of this line*

&enjoy!

Byee!
Chat With the Users!
Editing Features
Illustrated below are the undo and redo features of our editor.
Export

A User may export a file either through the button on the toolbar or through the File menu. Exporting a file will store a version of the file on the user’s computer in txt format.
File Transfer!

[Images of file transfer process]
Thank you!

If you’d like to download our application go to: http://web.mit.edu/lilibayo/Public

and Download
HrbCollab.JAR
– or –
HrbCollabwFileTransfer.JAR
Best design

- Greg Brockman
- Stephanie Cheng
- Karen Sittig
Fred: the Friendly Editor

Completely decentralized, peer-to-peer design

- No distributed locking, consensus, or conflicts
- Robust to arbitrary host or link failures, network partitioning
- Messages can arrive in any order
  - Can be passed on by any host
- Transparently edit online or offline

- Acknowledgements: Jessica Hamrick, Alex Dehnert
Fred design

Identifiers

- Each message has an identifier
  - Characters tagged with their messages' identifiers
- Identifier is $epoch$-$host$-$sequence$[-document]
  - Epoch: Lamport clock
  - Host: host + random string
  - Sequence: monotonically increasing counter
  - Document: target document name
- Order by dictionary order
  - Allows globally consistent merge
Fred design

Protocols

- Discovery protocol to find documents
- Connect protocol to bootstrap into edit session
- Edit protocol to update documents
- Sync protocol to retrieve missing messages
Best user interface

- Rachel Chasin
- Shaunak Kishore
- Jeffrey Wu
text friends

Shaunak Kishore, Rachel Chasin, Jeff Wu
About Text Friends

- Text Friends, the trust-based collaborative text-editor
- Anyone can access any documents
- Unique vector graphics GUI with ntris font
Home Mode

- In Home mode you can see what people are doing
- Select a friend using the j and k buttons, or press Enter for help
- In Home mode, view the list of documents being edited with d
- Documents cached by the clients but saved at the server
Normal Mode

- Navigate documents in normal mode using the h, j, k, l keys
- Enter visual mode with v and highlight text, press q to quit
- Fingers never have to move far from the home row
- Use e and b to move through text by word, use x to delete
Insert Mode

- To type text, use i to go into insert mode
- Use I, a, or A to move the cursor as you enter insert mode
Starting Ntris

- armando has left, djackson has no opponent: time to play some ntris
Ntris

- Plays like Tetris, but with pieces of up to 10 blocks
- When you clear lines, your opponent is sent monstrous red pieces
Monstrous Red Piece!

- djackson tells us our grade in his class
Losing Ntris

- 6.005 Student has failed
6.005 JEOPARDY!
HKN Evaluation

Please take a few minutes now to fill out the HKN evaluation for 6.005

http://sixweb.mit.edu/

- note that HKN evaluations close soon, so you may want to evaluate all your Course VI classes now