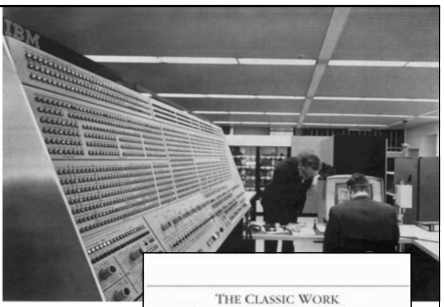
As We May Code

The art (and craft) of computer programming in the 21st century

Alan Dix
Lancaster University

www.hcibook.com/alan/papers/PPIG2008-as-we-may-code/

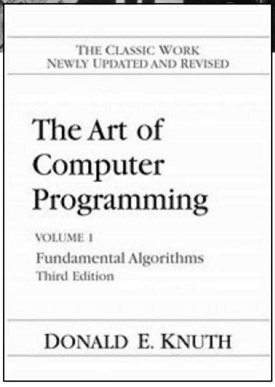
1968



Donald Knuth

The Art of
Computer Programming

so what's changed?



THE CLASSIC WORK
NEWLY UPDATED AND REVISED

The Art of
Computer
Programming

VOLUME 1
Fundamental Algorithms
Third Edition

DONALD E. KNUTH

obvious things ...

languages ... what we teach

1968 – Fortran, Algol, Cobol
1978 – Fortran, maybe still Cobol
1988 – Pascal, ADA, but never ever Cobol
1998 – C++, Java, VB, but never ever Cobol
2008 – Java, Java, Java, what's Cobol?

but how different are the courses?
variables, arrays, loops, functions, ...
Fortran by any other name ...

languages ... what is used

1968 – Fortran, Assembler, Cobol

1978 – mostly Cobol

1988 – VB, C, lots of Cobol

1998 – C++, VB, still lots of Cobol (Y2K!)

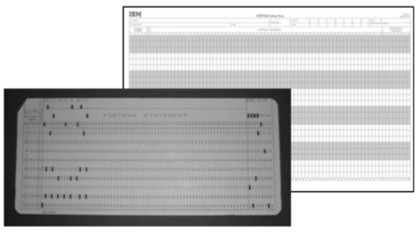
2008 – Java, C++,

Javascript, PHP, Python, Perl, Actionscript, Processing,

not just Fortran in new clothes

... and betcha life still some Cobol

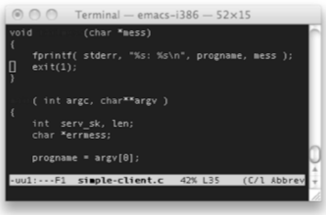
coding technology



30 years ago forms & cards

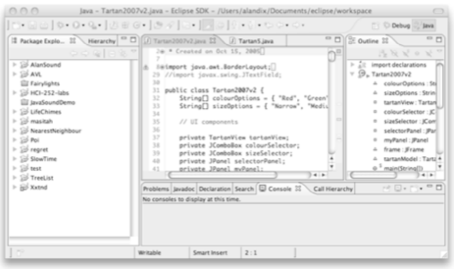
15 years ago

emacs & listings



Terminal — emacs-i386 — 52×15

```
void         (char *mess)
{
    fprintf( stderr, "%s: %s\n", progname, mess );
    exit(1);
}

    ( int argc, char**argv )
{
    int  serv_sk, len;
    char *errmess;

    progname = argv[0];
-uu1:---F1  simple-client.c   42% L35    (C/l Abbrev
```



Java - Tartan2007v2.java - Eclipse SDK - /Users/alandix/Documents/eclipse/workspace

```
 * Created on Oct 15, 2005

import java.awt.BorderLayout;
//import javax.swing.JTextField;

public class Tartan2007v2 {
    String[] colourOptions = { "Red", "Green"
    String[] sizeOptions = { "Narrow", "Mediu

    // UI components

    private TartanView tartanView;
    private JComboBox colourSelector;
    private JComboBox sizeSelector;
    private JPanel selectorPanel;
    private JPanel myPanel;
```

No consoles to display at this time.

NOW

IDEs & NO paper

programmers

	C20	C21
expertise	specialists	anyone
mathematics	strong	weak
team / community of practice	organisational unit	global community

what is programming?

what ~~is~~ programming?
was

problem solving

Problem:
find square root

+

Primitives:
```
INTEGER, +, *,
IF, GOTO, WHILE
FUNCTION f(x)
```

Solution:
```
while ( abs(next-last) > 0.001 ) {
  last = next;
  next = ( x + x/last ) / 2;
}
```

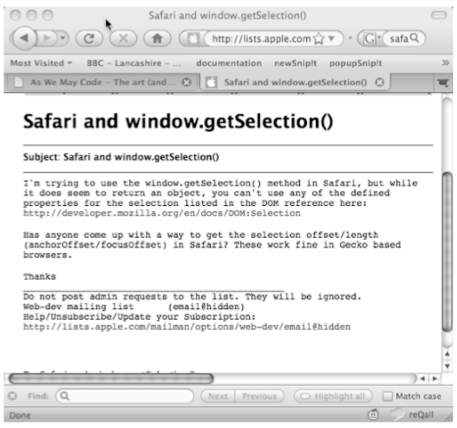
what is programming?
now

British Library programming

wiki + google + tweak

find the solution

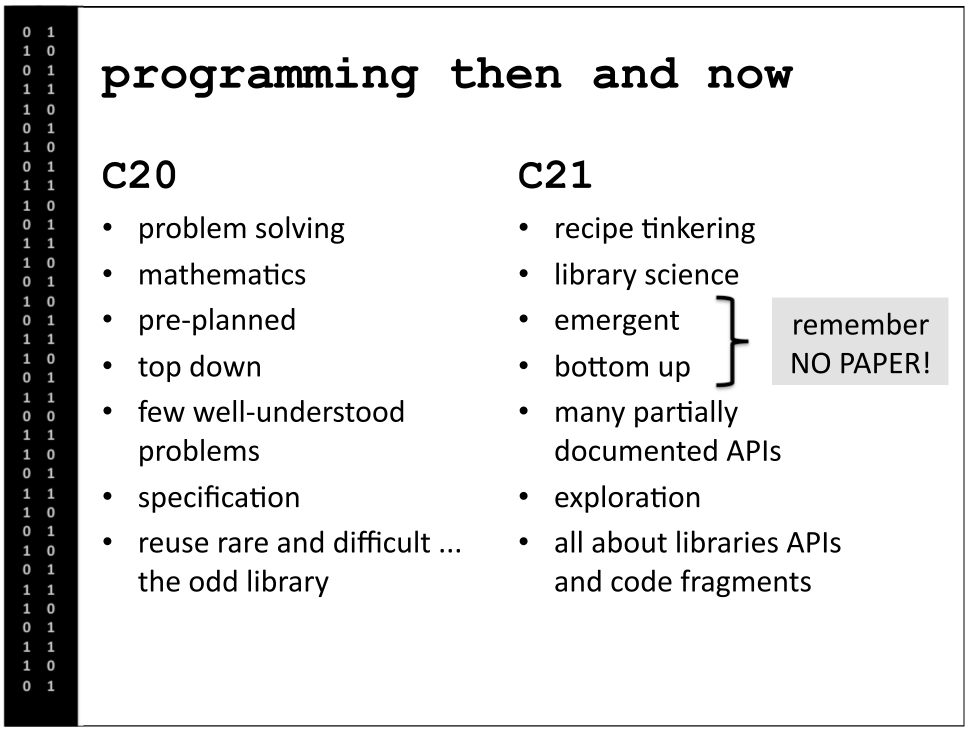
... on the net



Safari and window.getSelection()

Subject: Safari and window.getSelection()

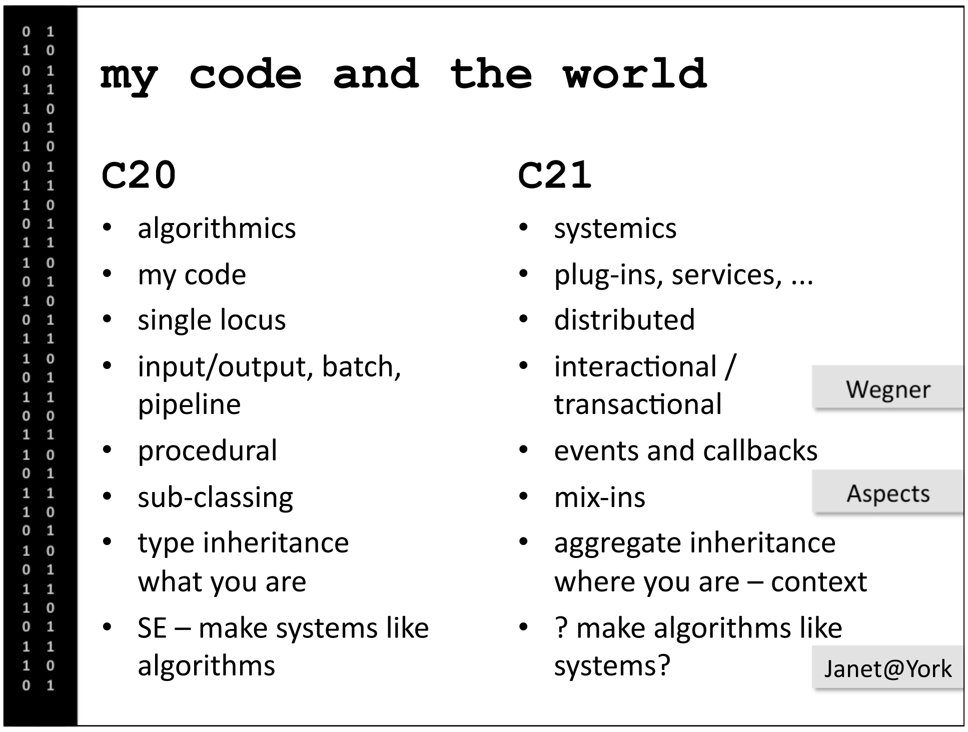
```
I'm trying to use the window.getSelection() method in Safari, but while
it does seem to return an object, you can't use any of the defined
properties for the selection listed in the DOM reference here:
http://developer.mozilla.org/en/docs/DOM:Selection

Has anyone come up with a way to get the selection offset/length
(anchorOffset/focusOffset) in Safari? These work fine in Gecko based
browsers.

Thanks
_______________________________________________
Do not post admin requests to the list. They will be ignored.
Web-dev mailing list      (email@hidden)
Help/Unsubscribe/Update your Subscription:
http://lists.apple.com/mailman/options/web-dev/email@hidden
```



programming then and now

C20	C21
• problem solving	• recipe tinkering
• mathematics	• library science
• pre-planned	• emergent
• top down	• bottom up
• few well-understood problems	• many partially documented APIs
• specification	• exploration
• reuse rare and difficult ... the odd library	• all about libraries APIs and code fragments

remember NO PAPER!



my code and the world

C20	C21
• algorithmics	• systemics
• my code	• plug-ins, services, ...
• single locus	• distributed
• input/output, batch, pipeline	• interactional / transactional
• procedural	• events and callbacks
• sub-classing	• mix-ins
• type inheritance what you are	• aggregate inheritance where you are – context
• SE – make systems like algorithms	• ? make algorithms like systems?

Wegner

Aspects

Janet@York

procedures -> events

linear

```
x = 3 * y
z = x + y
z = z * z
```

loop

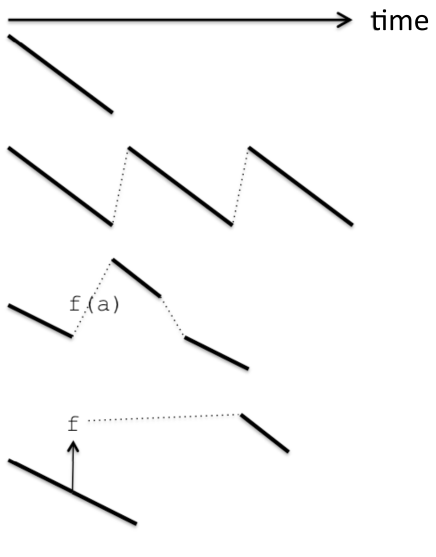
```
while (x<3) {
   y = y + x;
   x = x + 1; }
```

procedure

```
int f(x) {... }
   ...
a = 42
b = f(a)
a = 2 * b;
```

event / callback

```
int f(x) {... }
   ...
j = new Ajax()
j.setHandler(f)
j.invoke();
```



AJAX in action!

```
function getSnipActions(div_id,snipid) {
    tellmeabout_snip(div_id,snipid,actionsCallback)
}
function actionsCallback(div_id,matches) {
    matchesObj = $(div_id);
    var html = formatter.format(matches);
    matchesObj.innerHTML = html;
}
```

```
function tellmeabout_snip(id,snipid,callback,includeNoActions) {
    if ( arguments.length < 4 ) includeNoActions = false;
    doAjaxCall(TellmeaboutUrl,{ snipid: snipid, op: 'actions' },
            tellmeaboutResponse,{ id: id, snipid: snipid, callback: callback,
                                        includeNoActions: includeNoActions });
}
```

Wordpress plug-ins

```
function save_status($new_status) {
  if ( $new_status === 'publish') {
       return 'private';
  } else {
       return $new_status;
  }
}

add_filter('status_save_pre', 'save_status');
```

generic non-inheritance extension framework

join point

callback

bugs and debugging

C20

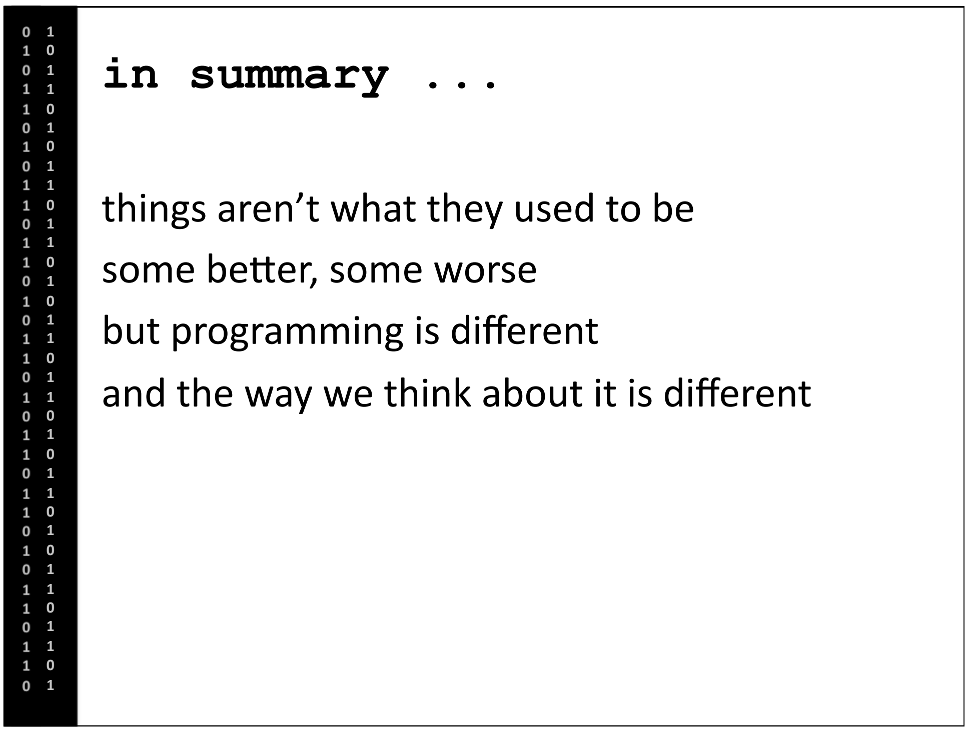
- algorithm
- single component
- unexpected input/event
- internal – logical failure in own new code
- lack of skill

C21

- structural
- feature interaction
- malicious attack
- external – error in infrastructure
- lack of knowledge

ALWAYS

- trial and error vs. systematic
- quick fix vs. understand problem



in summary ...

things aren’t what they used to be
some better, some worse
but programming is different
and the way we think about it is different