Cool Code

@KevlinHenney

cool, *adjective*

- fashionably attractive or impressive
- excellent
- used to express acceptance or agreement
- used as an intensive
- used when a conversation goes silent
- marked by deliberate effrontery or lack of due respect or discretion
- restrained or relaxed in style

code, *noun*

- a system of words, figures or symbols used to represent others
- a set of instructions for a computer
- a computer program, or a portion thereof
- a set of conventions or principles governing behaviour or activity in a particular domain
- a system or collection of rules or regulations on any subject

```
STR
16571  LD C A      79
(187)  LD L A      185
( 64)  LD H N      38 67
16575  LD A (HL)   126
(191)  LD B N      6  1
( 64)  AND N       230 127
       CP N        254 0
       JP Z DIS    40 20
       INC B       4
       CP N        254 110
       JR2DIS      40 15
       CP N        254 39
       JP C DIS    56 11
       LD A (HL)   126          '0' DIFF
       INC B       4
       LD L N      46 55        '1' EMPTY
       ADD (HL)    134
       BIT 7,A     203 127      '2' WALL
       JP Z DIS    40  2
       LD B N      6   0        '3' SAME
       LD A B      120
       LD L C      105
       RET         201
TABLES
16607  1 11 -1 -11 -10 -12 12 10
16615  13 -13 21 -21 23 -23 -9 9
16623  11 10 12
16626  54 55 39 51 53
PIECE
16631  XOR A       175
(247)  LD(NN) A    50 70 64
( 64)  LD A (HL)   126
       AND N       230 127
       CP P        254 53
       JP Z DIS    40 79
       LD C N      14 1
       LD B N      6  8
       LD HL NN    33 231 64
       CP N        254 51
       JP Z DIS    40 22
       LD L N      46 223
       CP K        254 48
       JP Z DIS    40 16
       LD C B      72
       CP H        254 54
       JP Z DIS    40 11
       LD B N      6  4
       CP R        254 55
       JP Z DIS    40  5
       LD L N      46 227
       CP B        254 39
       RET NZ      192

SHIFT
16882  LD HL NN    33 99 64
(242)  LD DE NN    17 70 64
( 65)  LD BC NN    1  28 0
       JP C DIS    56 1
       EX DE HL    235
       LDIR        237 176
       RET         201
PSC
17162  AND N       230 127
(10)   LD HL NN    33 242 64
(67)   LD B  N      6  5
       CP (HL)     190
       RET Z       200
       INC HL      35
       DJNZ DIS    16 251
       LD A B      120
       RET         201
MPSCAN
17046  XOR A       175
(150)  LD (NN) A   50 65 64
( 66)  LD B N      6  86
       LD HL NN    33 62 67
       INC HL      35
       PUSH HL     229
       PUSH BC     197
       LD E L      93
       CALL STR2   205 191 64
       CP N        254 3
       JP NZ DIS   32 41
       LD L E      107
       LD (NN) HL  34 7 64
       CALL MOVE   205 247 64
       CALL TL     205 130 66
       JP Z DIS    40 29
       LD E A      95
       LD D N      22 67
       CALL PMOVE  205 255 66
       EXX         217
       AND A       167
       CALL SHIFT  205 242 65
       CALL CHK    205 1 66
       EXX         217
       LD(HL) B    112
       LD A C      121
       LD(DE) A    18
       JP C DIS    56 3
       CALL SCORE  205 153 65
       SCF         55
       CALL SHIFT  205 242 65
       JP DIS      24 222
       POP BC      193
       POP HL      225
       DJNZ DIS    16 200
       LD A (NN)   58 65 64
       CP N        254 0
       JP Z DIS    40 254 •
       LD HL NN    33 69 64
       LD A (HL)   126
       DEC HL      43
       DEC HL      43
       LD E (HL)   94
       LD D N      22 67
       LD (DE) A   18
       DEC HL      43
       LD L (HL)   110
       LD H D      98
17131  BIT 0,L     203 69
(235)  LD(HL) N    54 0
( 66)  JP Z DIS    40 2
       LD(HL) N    54 128
       CALL CHGMV  205 247 66
       RET         201
INC
17176  LD A L      125
(24)   EXX         217
(67)   LD(NN) A    50 128 64
       CALL SQ.AT  205 16 66
       EXX         217
       LD A C      121
       RET         201
DRIVER
16959  LD B N      6  5
(63)   LD A N      62 8
(66)   LD HL NN    33 159 67
       INC HL      35
       LD(HL) A    119
       DJNZ DIS    16 252
       CALL KT     205 160 64
       CP N        254 3
       JP NZ DIS   32 238
       LD (NN) HL  34 7 64
       LD E L      93
       CALL MOVE   205 247 64
       LD HL NN    33 161 67
       CALL KT     205 160 64
       CP N        245 2
       EX DE HL    235
       JP NC DIS   48 220
       CALL TL     205 130 66
       JP Z DIS    40 215
       CP C        185
       JP NZ DIS   32 248
       CALL PMOVE  205 255 66
       EXX         217
       CALL CHK    205 1 66
       EXX         217
       JP C DIS    56 8
       CALL CHGSQ  205 235 66
       CALL MPSCAN 205 150 66
       JP DIS      24 194
       LD (HL) B   112
       LD A C      121
       LD (DE) A   18
       JP DIS      24 249
TEST LIST
17026  LD HL NN    33 70 64
(130)  DEC (HL)    53
( 66)  LD A (HL)   126
       INC A       60
       RET Z       200
       ADD L       133
       LD L A      111
       LD A (HL)   126
       RET         201

PAWN
16721  LD A (HL)   126
(81)   AND N       230 128
(65)   LD HL NN    33 228 64
       JP NZ DIS   32 2
       LD L  N     46 241
       LD D  N     22 3
       LD A  E     123
       ADD (HL)    134
       PUSH HL     229
       PUSH AF     245
       CP N        254 63
       JP C DIS    56 32
       CP N        254 148
       JP NC DIS   48 28
       CALL STR    205 187 64
       CP N        254 0
       JP Z DIS    40 28
       CP N        254 1
       JP NZ DIS   32 17
       LD A D      122
       CP N        254 1
       JP NZ DIS   32 12
       CALL ALIST  205 141 66
       LD A E      123
       CP N        254 82
       JP C DIS    56 19
       CP N        254 126
       JP NC DIS   48 15
       POP AF      241
       POP HL      225
   DEC INC HL      43
       DEC D       21
       JP NZ DIS   32 210
       RET         201
       LD A D      122
       CP N        254 1
       CALL NZ ALIST 196 141 66
       JP DIS      24 241
       POP AF      241
       POP HL      225
       LD E A      95
       JP DIS      24 197

CHK
16897  LD A (NN)   58 55 67
( 1)   ADD N       198 48
(66)   LD HL NN    33 62 67
       LD B A      71
       CPIR        237 177
       DEC HL      43
       LD (NN) HL  34 128 64
SQ.AT  LD B N      6 86
16912  LD HL NN    33 62 67
(16)   INC HL      35
(66)   PUSH HL     229
       PUSH BC     197
       LD E L      93
       CALL STR2   205 191 64
       CP 0        254 0
       JP NZ DIS   32 25
       CALL CHEMV  205 247 66
       LD L E      107
       CALL MOVE   205 247 64
       CALL CHEMV  205 247 66
       CALL TL     205 130 66
       JP Z DIS    40 10
       LD HL(NN)   42 128 64

SCORE
16793  PUSH HL     229
(153)  PUSH BC     197
( 65)  PUSH DE     213
       PUSH HL     229
       PUSH BC     197
       LD D L      85
       LD HL NN    33 64 64
       CALL NN     205 36 7
       CALL PSC    205 10 67
       LD A B      120
       ADD A H     132
       LD C A      79
       POP AF      241
       CALL PSC    205 10 67
       POP HL      225
       CALL INC    205 24 67
       JP NC DIS   48 1
       ADD A B     128
       LD C A      79
       POP HL      225
       POP DE      209
       LD E (HL)   94
       LD (HL) D   114
       PUSH HL     229
       PUSH DE     213
       CALL INC    205 24 67
       JP NC DIS   48 1
       SUB B       144
       PUSH AF     245
       CALL CHEMV  205 247 66
       CALL CHK    205 1 66
       POP BC      193
       JP NC DIS   48 2
       INC B       4
       INC B       4
       POP DE      209
       POP HL      225
       LD (HL) E   115
       POP HL      225
       CALL CHG    205 250 66
       CALL INC    205 24 67
       JP NC DIS   48 1
       DEC B       5
       CALL CHG    205 250 66
       CALL CHEMV  205 247 66
       LD A B      120
       LD HL NN    33 60 64
       LD (HL) A   119
       EX DE HL    235
       LD HL NN    33 65 64
       CP (HL)     190
       RET C       216
       LD BC NN    1  5  0
       JP DIS      24 11
```

```
# HERE IS THE PHILOSOPHY OF GUILDENSTERN:       ON EVERY APPEARANCE OR DISAPPEARANCE OF THE MANUAL THROTTLE
# DISCRETE TO SELECT P67 OR P66 RESPECTIVELY:   ON EVERY APPEARANCE OF THE ATTITUDE-HOLD DISCRETE TO SELECT P66
# UNLESS THE CURRENT PROGRAM IS P67 IN WHICH CASE THERE IS NO CHANGE

GUILDEN         EXTEND                  # IS UN-AUTO-THROTTLE DISCRETE PRESENT?
# STERN                                 # RSB 2009: Not originally a comment.
                READ CHAN30
                MASK    BIT5
                CCS     A
                TCF     STARTP67        # YES
P67NOW?         TC      CHECKMM         # NO:  ARE WE IN P67 NOW?
                DEC     67
                TCF     STABL?          # NO
STARTP66        TC      FASTCHNG        # YES
                TC      NEWMODEX
DEC66           DEC     66
                EXTEND
                DCA     HDOTDISP        # SET DESIRED ALTITUDE RATE - CURRENT
                DXCH    VDGVERT         #       ALTITUDE RATE.
STRTP66A        TC      INTPRET
                SLOAD   PUSH
                        PBIASZ
                SLOAD   PUSH
                        PBIASY
                SLOAD   VDEF
                        PBIASX
                VXSC    SET
                        BIASFACT
                        RODFLAG
                STOVL   VBIAS
                        TEMX
                VCOMP
                STOVL   OLDPIPAX
                        ZEROVECS
                STODL   DELVROD
                        RODSCALE
                STODL   RODSCAL1
                        PIPTIME
                STORE   LASTTPIP
                EXIT
                CAF     ZERO
                TS      FCOLD
                TS      FWEIGHT
                TS      FWEIGHT +1
VRTSTART        TS      WCHVERT
# Page 801
                CAF     TWO             # WCHPHASE = 2 ---> VERTICAL: P65,P66,P67
                TS      WCHPHOLD
                TS      WCHPHASE
                TC      BANKCALL        # TEMPORARY, I HOPE HOPE HOPE
                CADR    STOPRATE        # TEMPORARY, I HOPE HOPE HOPE
                TC      DOWNFLAG        # PERMIT X-AXIS OVERRIDE
                ADRES   XOVINFLG
                TC      DOWNFLAG
                ADRES   REDFLAG
                TCF     VERTGUID

STARTP67        TC      NEWMODEX        # NO HARM IN "STARTING" P67 OVER AND OVER
                DEC     67              # SO NO NEED FOR A FASTCHNG AND NO NEED
                CAF     ZERO            # TO SEE IF ALREADY IN P67.
                TS      RODCOUNT
                CAF     TEN
                TCF     VRTSTART

STABL?          CAF     BIT13           # IS UN-ATTITUDE-HOLD DISCRETE PRESENT?
                EXTEND
                RAND    CHAN31
                CCS     A
                TCF     GUILDRET        # YES ALL'S WELL

P66NOW?         CS      MODREG
                AD      DEC66
                EXTEND
                BZF     RESTART?

                CA      RODCOUNT        # NO. HAS THE ROD SWITCH BEEN "CLICKED"?
                EXTEND
                BZF     GUILDRET        # NO. CONTINUE WITH AUTOMATIC LANDING
                TCF     STARTP66        # YES. SWITCH INTO THE ROD MODE.

RESTART?        CA      FLAGWRD1        # HAS THERE BEEN A RESTART?
                MASK    RODFLBIT
                EXTEND
                BZF     STRTP66A        # YES.  REINITIALIZE BUT LEAVE VDGVERT AS
                                        #       IS.

                TCF     VERTGUID        # NO: CONTINUE WITH R.O.D.
```

```
/* grep: search for regexp in file */
int grep(char *regexp, FILE *f, char *name)
{
        int n, nmatch;
        char buf[BUFSIZ];

        nmatch = 0;
        while (fgets(buf, sizeof buf, f) != NULL) {
                n = strlen(buf);
                if (n > 0 && buf[n-1] == '\n')
                        buf[n-1] = '\0';
                if (match(regexp, buf)) {
                        nmatch++;
                        if (name != NULL)
                                printf("%s:", name);
                        printf("%s\n", buf);
                }
        }
        return nmatch;
}

/* matchhere: search for regexp at beginning of text */
int matchhere(char *regexp, char *text)
{
        if (regexp[0] == '\0')
                return 1;
        if (regexp[1] == '*')
                return matchstar(regexp[0], regexp+2, text);
        if (regexp[0] == '$' && regexp[1] == '\0')
                return *text == '\0';
        if (*text!='\0' && (regexp[0]=='.' || regexp[0]==*text))
                return matchhere(regexp+1, text+1);
        return 0;
}

/* match: search for regexp anywhere in text */
int match(char *regexp, char *text)
{
        if (regexp[0] == '^')
                return matchhere(regexp+1, text);
        do {    /* must look even if string is empty */
                if (matchhere(regexp, text))
                        return 1;
        } while (*text++ != '\0');
        return 0;
}

/* matchstar: search for c*regexp at beginning of text */
int matchstar(int c, char *regexp, char *text)
{
        do {    /* a * matches zero or more instances */
                if (matchhere(regexp, text))
                        return 1;
        } while (*text != '\0' && (*text++ == c || c == '.'));
        return 0;
}
```

```
/**
 * Runs the bare test sequence.
 * @exception Throwable if any exception is thrown
 */
public void runBare() throws Throwable {
    setUp();
    try {
        runTest();
    }
    finally {
        tearDown();
    }
}
/**
 * Override to run the test and assert its state.
 * @exception Throwable if any exception is thrown
 */
protected void runTest() throws Throwable {
    Method runMethod= null;
    try {
        // use getMethod to get all public inherited
        // methods. getDeclaredMethods returns all
        // methods of this class but excludes the
        // inherited ones.
        runMethod= getClass().getMethod(fName, null);
    } catch (NoSuchMethodException e) {
        fail("Method \""+fName+"\" not found");
    }
    if (!Modifier.isPublic(runMethod.getModifiers())) {
        fail("Method \""+fName+"\" should be public");
    }

    try {
        runMethod.invoke(this, new Class[0]);
    }
    catch (InvocationTargetException e) {
        e.fillInStackTrace();
        throw e.getTargetException();
    }
    catch (IllegalAccessException e) {
        e.fillInStackTrace();
        throw e;
    }
}
```

```
import re, collections

def words(text): return re.findall('[a-z]+', text.lower())

def train(features):
    model = collections.defaultdict(lambda: 1)
    for f in features:
        model[f] += 1
    return model

NWORDS = train(words(file('big.txt').read()))

alphabet = 'abcdefghijklmnopqrstuvwxyz'

def edits1(word):
   splits     = [(word[:i], word[i:]) for i in range(len(word) + 1)]
   deletes    = [a + b[1:] for a, b in splits if b]
   transposes = [a + b[1] + b[0] + b[2:] for a, b in splits if len(b)>1]
   replaces   = [a + c + b[1:] for a, b in splits for c in alphabet if b]
   inserts    = [a + c + b     for a, b in splits for c in alphabet]
   return set(deletes + transposes + replaces + inserts)

def known_edits2(word):
    return set(e2 for e1 in edits1(word) for e2 in edits1(e1) if e2 in NWORDS)

def known(words): return set(w for w in words if w in NWORDS)

def correct(word):
    candidates = known([word]) or known(edits1(word)) or known_edits2(word) or [word]
    return max(candidates, key=NWORDS.get)
```

```
(define (eval exp env)
  (cond ((self-evaluating? exp) exp)
        ((variable? exp) (lookup-variable-value exp env))
        ((quoted? exp) (text-of-quotation exp))
        ((assignment? exp) (eval-assignment exp env))
        ((definition? exp) (eval-definition exp env))
        ((if? exp) (eval-if exp env))
        ((lambda? exp)
         (make-procedure (lambda-parameters exp)
                         (lambda-body exp)
                         env))
        ((begin? exp)
         (eval-sequence (begin-actions exp) env))
        ((cond? exp) (eval (cond->if exp) env))
        ((application? exp)
         (apply (eval (operator exp) env)
                (list-of-values (operands exp) env)))
        (else
         (error "Unknown expression type - EVAL" exp))))
```

```
def eval(x, env=global_env):
    "Evaluate an expression in an environment."
    if isa(x, Symbol):              # variable reference
        return env.find(x)[x]
    elif not isa(x, list):          # constant literal
        return x
    elif x[0] == 'quote':           # (quote exp)
        (_, exp) = x
        return exp
    elif x[0] == 'if':              # (if test conseq alt)
        (_, test, conseq, alt) = x
        return eval((conseq if eval(test, env) else alt), env)
    elif x[0] == 'set!':            # (set! var exp)
        (_, var, exp) = x
        env.find(var)[var] = eval(exp, env)
    elif x[0] == 'define':          # (define var exp)
        (_, var, exp) = x
        env[var] = eval(exp, env)
    elif x[0] == 'lambda':          # (lambda (var*) exp)
        (_, vars, exp) = x
        return lambda *args: eval(exp, Env(vars, args, env))
    elif x[0] == 'begin':           # (begin exp*)
        for exp in x[1:]:
            val = eval(exp, env)
        return val
    else:                           # (proc exp*)
        exps = [eval(exp, env) for exp in x]
        proc = exps.pop(0)
        return proc(*exps)

isa = isinstance

Symbol = str
```

```
def to_string(exp):
    "Convert a Python object back into a Lisp-readable string."
    return '('+' '.join(map(to_string, exp))+')' if isa(exp, list) else str(exp)

def repl(prompt='lis.py> '):
    "A prompt-read-eval-print loop."
    while True:
        val = eval(parse(raw_input(prompt)))
        if val is not None: print to_string(val)
```


v=0000;eval$s=%q~d=%!^Lcf<LK8,
4ZojjV)O>qIH1/n[|2yE[>:ieC
yH?b[F^e7C/56j|pmRe+:)B
PPu01Avw^<IiQ=5$'D-y?
6ygIL8xI#LNz3v}T=4W
}RT5-iJbbG5P-DHB<.
$*are@b4U351Q-ug5
PFixrPvl&<p[]1IJ
y]0`_PstfUxOC(q
zcaAi?]^lCVYp!;
(;v=(v-($*+[45,
360)+"al$s=%q#{
126}";d.gsub!(/
require"zlib"||
d.map{|c|n=(n||
e=["%x"%n].pack
Inflate.inflate(
)[0];22.times{|y|
(y*2.0-21)/22)**(;
2-1).times{|x|u=(e+
90*x/w+v+90,90/w];s[(
32<<".:%#")[4*u.count((
s+";_ The Qlobe#{" "*18+ (
oh, 2010")}";exit~;_ The Qlobe
_@7gj*LJ=c5nM)Tp1g0%Xv.,S[<>YoP
"%.#% :::##" 97N-A&Kj_K_><wS5rtWk@*a+Y5
::########## O98(Zh)'Iof*nm.,$C5Nyt=
"## ##########" g6`YT+qLw9k^ch|K'),tc
#. .####:#######" lL27FZ0ij)7TQCI)P7u
:############" R,YvZ_rnv6ky-G+4U'
########################" 00x8RR%`Om7VDp4M5
##########:#### %#####" EGgDt8Lm#;bc4zS^
.##############:##% .## ." /,}.YOIFj(k&q_V
.################. #. " ;s="v=%04o;ev"%
:################% : "])[n=0].to_i;)%
######### " ;;"%c"%126+$s<<
#######% " |\s|".*"/,"");;
:######. " ;d=d.unpack"C*"
.######: . ")*90+(c-2)%91};
:###### #: " &&"H*";e=Zlib::
.#####% :: " &&e).unpack("b*"
%### " ;w=(Math.sqrt(1-(
.#% " ;2))*23).floor;(w*
")[y*z=360,z]*2;u=u[
" ;y*80)+120-w+x]=(""<<
" ;"0"))/u.size]}};puts\
"# :#######" ;"Copyright(C).Yusuke End\
Copyright(C).Yusuke Endoh, 2010

```
/^1?$|^(11+?)\1+$/
```

```
// Erwin Unruh, untitled program,
// ANSI X3J16-94-0075/ISO WG21-462, 1994.

template <int i>
struct D
{
    D(void *);
    operator int();
};

template <int p, int i>
struct is_prime
{
    enum { prim = (p%i) && is_prime<(i>2?p:0), i>::prim };
};

template <int i>
struct Prime_print
{
    Prime_print<i-1>    a;
    enum { prim = is_prime<i,i-1>::prim };
    void f() { D<i> d = prim; }
};

struct is_prime<0,0> { enum { prim = 1 }; };
struct is_prime<0,1> { enum { prim = 1 }; };
struct Prime_print<2>
{
    enum { prim = 1 };
    void f() { D<2> d = prim; }
};

void foo()
{
    Prime_print<10> a;
}

// output:
// unruh.cpp 30: conversion from enum to D<2> requested in Prime_print
// unruh.cpp 30: conversion from enum to D<3> requested in Prime_print
// unruh.cpp 30: conversion from enum to D<5> requested in Prime_print
// unruh.cpp 30: conversion from enum to D<7> requested in Prime_print
// unruh.cpp 30: conversion from enum to D<11> requested in Prime_print
// unruh.cpp 30: conversion from enum to D<13> requested in Prime_print
// unruh.cpp 30: conversion from enum to D<17> requested in Prime_print
// unruh.cpp 30: conversion from enum to D<19> requested in Prime_print
```

If you don't have time to read, you don't have the time or the tools to write.

Stephen King

LIFE IS A GAME

Steven "Doc" List

Product Manager, ThoughtWorks Learning™

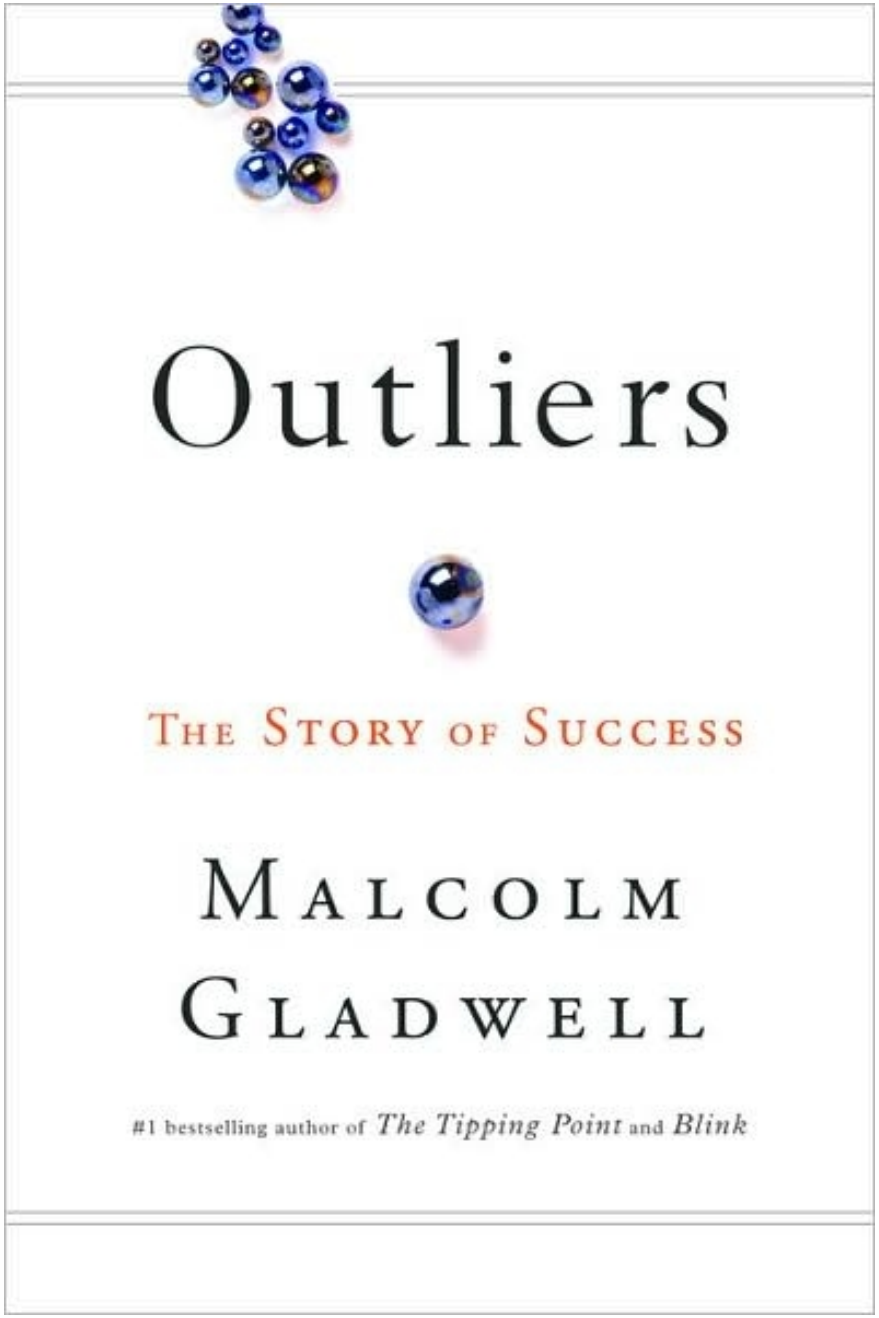
Who plays online games?

Who plays online games?

Who has certifications?

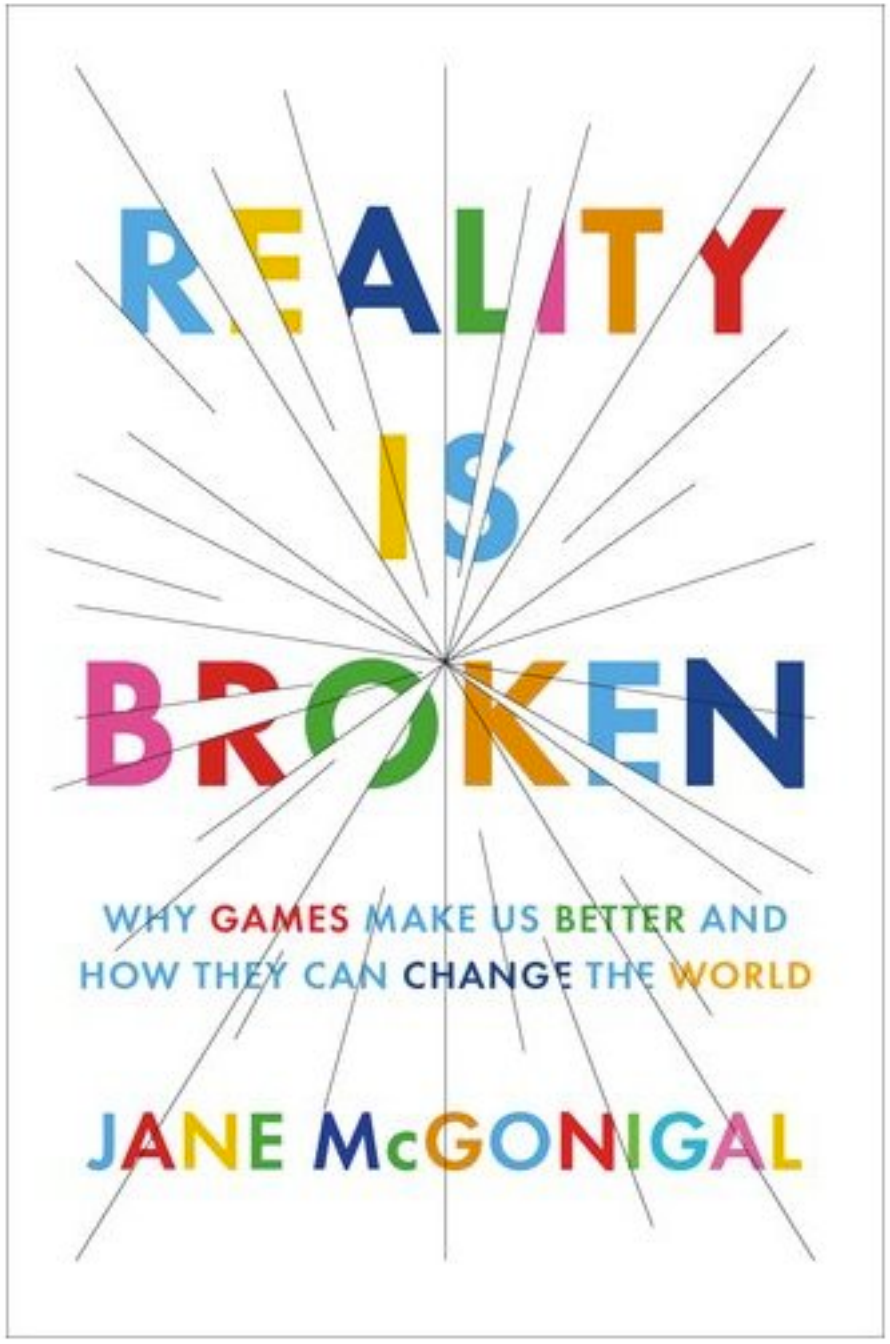
Who has certifications?

Who thinks that they're valuable?



Malcolm Gladwell

"Outliers: The Story of Success"



Jane McGonigal

"Reality is Broken: Why Games Make Us Better and How They Can Change the World"

Level Up

Level Up

Power Up

Level Up

Power Up

Gain Experience

Level Up

Power Up

Gain Experience

Get Recognition

Level Up

Power Up

Gain Experience

Get Recognition

Collaborate

Mastery Quest™

Mastery Quest™

It's Coming!

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THREE OBJECTIONABLE THINGS

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PETE GOODLIFFE

PROGRAMMER / AUTHOR / COLUMNIST / TEACHER ★ CONSCIENTIOUS CODER

```
class Engine
{
public:
    //get singleton instance
    //static UrbEngine &UrbEngine::GetInstance();

    Engine();
    virtual ~Engine();

    float GetProgramEditQLinkParameter(int which_pad, int qlink_index, char
*formattedValueString);
    void SetProgramEditQLinkParameter(int which_pad, int qlink_index, float value);
    //void getParameterLabel(int index, char *label);
    //void getParameterDisplay(int index, char *text);
    //void getParameterName(int index, char *text);
    void setSampleRate(float sampleRate);
    float GetSamplerate()
```

why?

GOODLIFFE // PAY ATTENTION!

15 minutes!

ASPIDISTRA #1

25. THROWN UP

0:13 0 MOVES

✔ Play theme tune
(AVAudioPlayer)

✘ Fade in/out

Objective-C

Objective-C

categories

associative references

blocks

ROMAN TRAVELOGUE#2

PROBLEM#1

a nice the API

categories

(because one interface is never enough)

```
AVAudioPlayer *player = … ;
[player play];
[player stop];
```

```
AVAudioPlayer *player = … ;
[player play];
[player stop];
```

```
[player playWithFadeDuration:1.0];
[player stopWithFadeDuration:1.0];
```

```
@interface AVAudioPlayer
{
    …
}

- (id) initWithContentsOfURL:(NSURL*)url;

-  (void) play;
-  (void) stop;


@end
```

```
@interface AVAudioPlayer
{
    …
}

- (id) initWithContentsOfURL:(NSURL*)url;

- (void) play;
- (void) stop;
- (void) playWithFadeDuration:(float)secs;
- (void) stopWithFadeDuration:(float)secs;

@end
```

```
@interface AVAudioPlayer (Fades)

- (void) playWithFadeDuration:(float)secs;
- (void) stopWithFadeDuration:(float)secs;

@end
```

```
@implementation AVAudioPlayer (Fades)

- (void) playWithFadeDuration:(float)secs
{
    // magic happens here
}

- (void) stopWithFadeDuration:(float)secs
{
    // clever stuff in here
}

@end
```

```
AVAudioPlayer *player = … ;
[player play];
[player stop];
```

```
[player playWithFadeDuration:1.0];
[player stopWithFadeDuration:1.0];
```

THIS IS NOT A SUBLIMINAL MESSAGE

EQUIDISTANT CAMOMILE#4

PROBLEM#2

we need some new

instance variables

associative references

(a posh name for cheating)

```
static const char volumeLevelKey = ‘Q’;
NSNumber number = [NSNumber numberWithFloat:1.0];

objc_setAssociatedObject(self,
    &volumeLevelKey,
    &variable,
    OBJ_ASSOCIATION_RETAIN_NONATOMIC);
```

```
NSNumber *number =
    (NSNumber*)objc_getAssociatedObject(self, &volumeLevelKey);
```

```
@interface AVAudioPlayer (Fades)

- (void) playWithFadeDuration:(float)secs;
- (void) stopWithFadeDuration:(float)secs;

@property float fadeVolume;

@end
```

```
- (void) fadeVolume
{
    // gibberish in here
}

- (void) setFadeVolume
{
    // cobblers in here
}
```

```
float fadeVolume = player.fadeVolume;
```

A TRAVESTY OF PYLON #6

PROBLEM#3

we need to use another fancy language feature

blocks

(because C++ isn't the only cool language)

PROBLEM#3

when a fade has completed, do "something"

```
typedef void (^FadeCompleteBlock)();
```

```
typedef void (^FadeCompleteBlock)();



- (void) fadeToVolume:(float)volume
          withDuration:(float)secs
             andThen:(FadeCompleteBlock)action
```

```
typedef void (^FadeCompleteBlock)();

- (void) fadeToVolume:(float)volume
         withDuration:(float)secs
              andThen:(FadeCompleteBlock)action


[player fadeToVolume:0.0
        withDuration:1.0
             andThen:^{
                 [player stop];
                 player.volume = 1.0;
             }];
```

TRANSCENDENTAL SHOE #7

the morale of the story

(there is none)

Q & A

Pete Goodliffe @petegoodliffe pete@goodliffe.net

KEEP CALM AND CARRY ON

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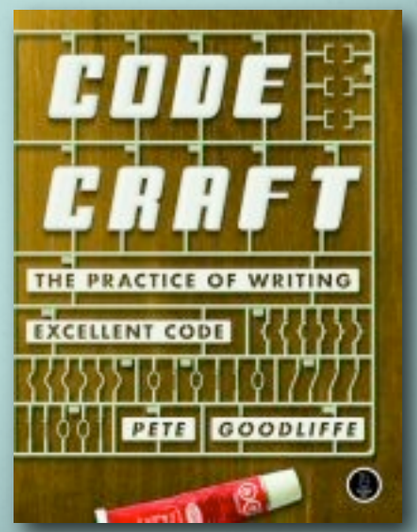

i knew you'd want another

```
[UIView animateWithDuration:0.5
                 animations:^{
                     imageView.layer.opacity = 0.1;
                 }
                 completion:^(BOOL finished){
                     [imageView removeFromSuperview];
                 }
```

BUMPH DULL, but important

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THANK YOU FOR READING // I HOPE IT WAS USEFUL

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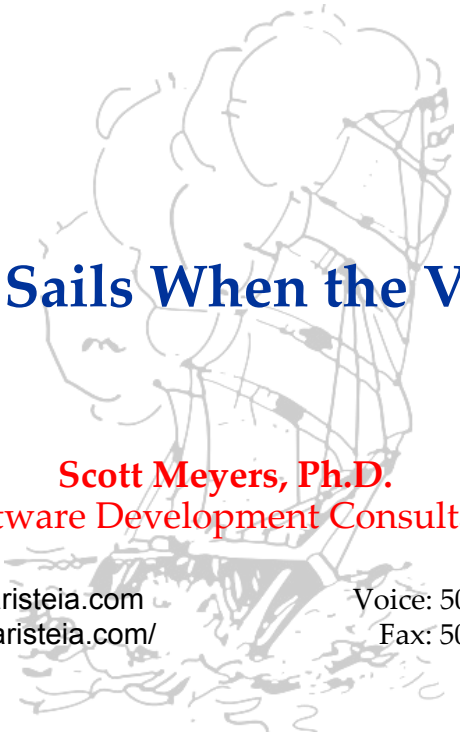

Why C++ Sails When the Vasa Sank

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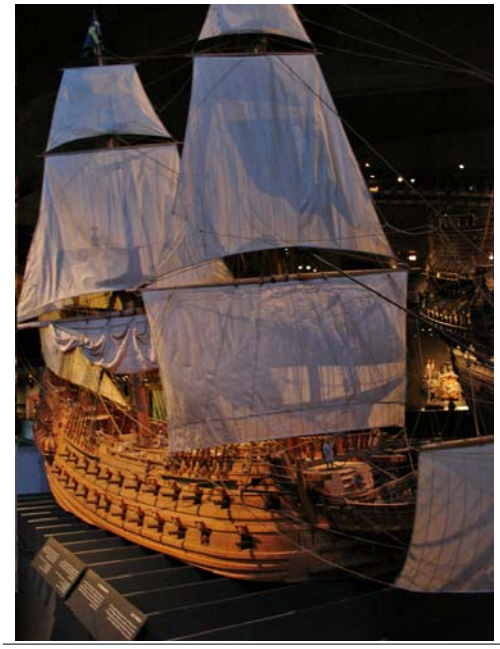
C++ in 1992

Endless stream of extension proposals.

> Every extension proposal should be required to be accompanied by a kidney. People would submit only serious proposals, and nobody would submit more than two.
>
> — Jim Waldo

> C++ is already too large and complicated for our taste...
>
> **Remember the Vasa!**
>
> — Bjarne Stroustrup

The Vasa



- Commissioned 1625 by Swedish King Gustav.
- Much redesign during construction.
- Heavily armed and decorated.

The Vasa

Top-heavy and unstable, it sank on its maiden voyage.

C++: Heavily Armed

Classes (concrete & abstract)	Namespaces	Virtual member functions
Constructors	RTTI	Nested classes
Destructors	Locales	Nonvirtual functions
Default parameters	Strings	Static member functions
Operator overloading	The STL	Pure virtual functions
new & delete	Iostreams	Function overloading
Inheritance (public, private, protected, virtual, multiple)	Static data (in classes, functions, namespaces, files)	Templates (including total & partial specialization)
Nonvirtual member functions	Inline functions	Function overloading
Exceptions	References	New Handlers
Private & protected members	bool	Friends

C++: Ornately Decorated

What does this do?

```
f(x);        // "invoke f on x"
```

- f may be a function (or function pointer or function reference).
- f may be an instance of a class overloading operator().
- f may be an object implicitly convertible to one of the above.
- f may be an overloaded function name.
  - ➡ At any of multiple scopes.
- f may be the name of one or more templates.
- f may be the name of one or more template specializations.
  - ➡ Total or partial.
- **f may be several of the above!**
  - ➡ E.g., overloaded function name + overloaded template name + name of template specialization(s).

C++ Must have Done Something Right

Programming Language	Position Feb 2011	Position Feb 2006	Position Feb 1996	Position Feb 1986
Java	1	1	-	-
C	2	2	1	1
C++	3	3	3	8
Python	4	8	22	-
PHP	5	5	-	-
C#	6	7	-	-
(Visual) Basic	7	4	2	5
Objective-C	8	46	-	-
JavaScript	9	10	-	-
Perl	10	6	7	-
Lisp	13	14	5	3
Ada	20	17	10	2

C++ Must have Done Something Right

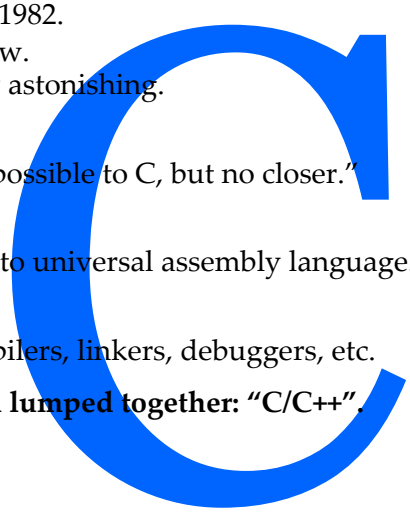
Language use in open source (from Black Duck):

Rank	Language	%
1	C	42.15
2	C++	12.43
3	Javascript	9.27
4	Java	8.87
5	PHP	6.09
6	Shell	3.98
7	Ruby	3.18
8	Python	2.69
9	Perl	1.78
10	Assembler	1.56
11	SQL	1.53
12	C#	1.21
13	XML Schema	1.04
14	Ada	0.57
15	MetaFont	0.49

Compatibility with

- Programmers:
  - ➡ Important in 1982.
  - ➡ Important now.
    - ◆ C longevity astonishing.
- Source code:
  - ➡ "As close as possible to C, but no closer."
- Object code:
  - ➡ Direct access to universal assembly language.
- Build chains:
  - ➡ Editors, compilers, linkers, debuggers, etc.

C & C++ still often lumped together: "C/C++".



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9	Perl	1.78
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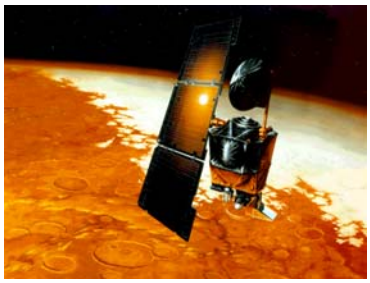
Very General Features

Lead to surprising uses.



- Destructors.
  - ➡ RAII ⇒ general-purpose Undo.
  - ➡ Exception safety.
- Templates.
  - ➡ Generic programming (e.g., STL).
  - ➡ TMP.
    - ◆ Dimensional units analysis. $\frac{1}{X_0} = 4\,\alpha\,r_e^2\,\frac{N_A}{A}\,\left\{Z^2\,[L_{rad} - f(Z)] + Z\,L'_{rad}\right\}$
- Overloading.
  - ➡ Generic programming.
  - ➡ Smart pointers.
  - ➡ Function objects.

A language for library writers.

```
Energy<> finalEnergy(Element<> const & material, Density<> const dens,
                     Length<> const thick, Energy<> const initEnergy) {
  AtomicWeight<> const A = material->atomicWeight;
  AtomicNumber<> const Z = material->atomicNumber;
  Number<> const L_rad = log( 184.15 / root<3>( Z ) );
  Number<> const Lp_rad = log( 1194. / root<3>(Z*Z) );
  Length<> const X_0 = 4.0 * alpha * r_e * r_e * N_A / A *
                       ( Z * Z * L_rad + Z * Lp_rad );
  return initEnergy / exp( thick / X_0 );
}
```

Paradigm Agnosticism

- Procedural programming.
  - ➡ Free functions:
    - ◆ Basis of STL.
    - ◆ Naturally models symmetric relationships.
    - ◆ Facilitates natural type extension.
- OOP.
  - ➡ Including MI.
- Generic programming.

  I tried to implement STL in other languages and failed. C++ was the only language in which I could do it.

  — Alexander Stepanov
- Functional programming.
  - ➡ Function objects.
  - ➡ TMP.

Paradigm Agnosticism

- "Unsafe" programming.
  - ➡ Pointers, casts, unchecked arrays, etc.
  - ➡ **"Trust the programmer."**

- "Safe" programming.
  - ➡ Vectors with bounds checking, checked iterators, etc.

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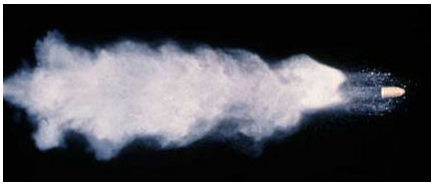
Commitment to Systems Programming

Suitable for challenging systems applications.

- Program speed.
  - ➡Many systems can never be fast enough.
- Program size.
  - ➡Static (including RTL).
  - ➡Dynamic.
- Data layout.
  - ➡Drivers.
  - ➡Communications protocols.
  - ➡Use with legacy code/systems.



- Efficient communication with foreign entities.
  - ➡Hardware.
  - ➡OSes.
  - ➡Code in other languages.

C++ vs. The Vasa

So far, C++ has escaped the fate of the Vasa; it has not keeled over and disappeared – despite much wishful thinking and many dire predictions.

— Bjarne Stroustrup, 1996

Why?

- Compatibility with C.
- Very general features.
- Paradigm agnosticism.
- Commitment to systems programming.

Further Information

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  ➡ Primarily an interview with Bjarne Stroustrup.
- "TIOBE Programming Community Index," *TIOBE Software*, http://www.tiobe.com/index.php/content/paperinfo/tpci/.
- "Open Source Project Data," *Black Duck Open Source Resource Center*, http://www.blackducksoftware.com/oss/projects.
- "C/C++'s Enduring Popularity," *Coverity Software Integrity Blog*, February 22, 2010.

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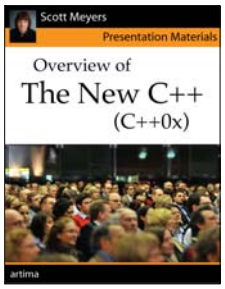

About Scott Meyers

Scott is a trainer and consultant on the design and implementation of software systems, typically in C++. His web site,

http://www.aristeia.com/

provides information on:

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