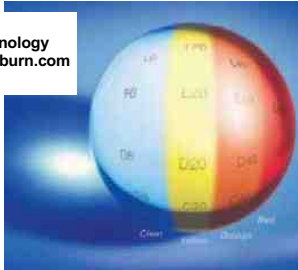


# Crystal: The Un-Methodology


Alistair Cockburn  
Humans and Technology  
<http://AlistairCockburn.com>



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Crystal  
is a *family*  
of methodologies  
based on a  
*genetic code*



developed by interviewing dozens of successful teams  
and asking how they succeeded

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## Crystal's Genetic Code




- 1 - Mindset
- 2 - Design priorities
- 3 - Project properties
- 4 - Design principles
- 5 - Key Techniques
- 6 - Samples

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## Crystal's Genetic Code

People learn skills in 3 stages

 Shu follow	<b>Learn a technique</b>
 Ha break	<b>Collect techniques</b>
 Ri leave	<b>Invent / blend techniques</b>

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## Crystal's Genetic Code

Software development consists only of  
**making ideas concrete** in an economic context

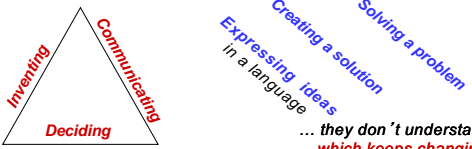
... a **Cooperative Game**  
of **Invention** and **Communication**

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## Crystal's Genetic Code

What we/they are doing:



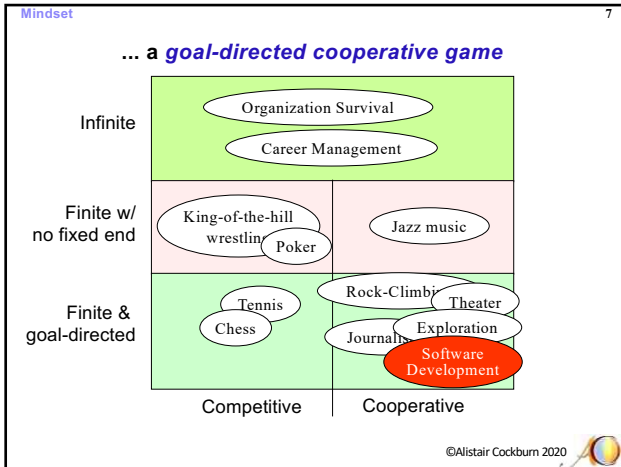
... they don't understand  
which keeps changing

To an interpreter unforgiving of error

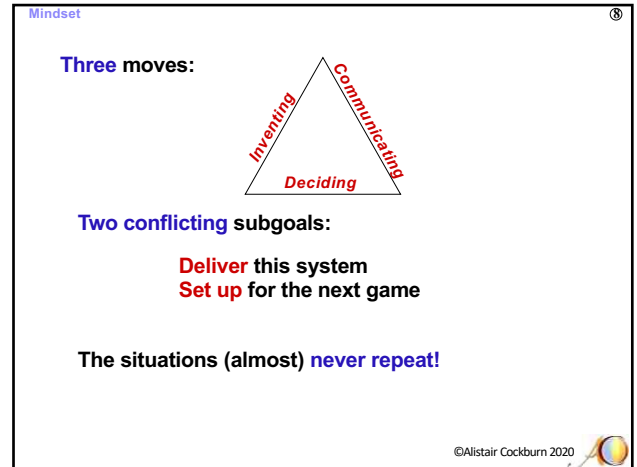
every decision has economic consequences  
and resources are limited.

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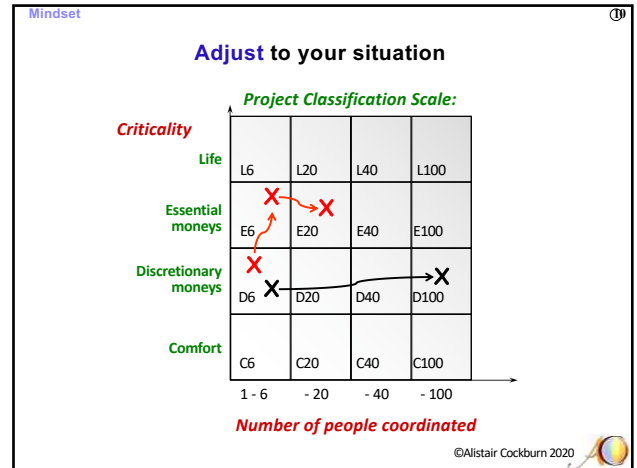
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Mindset 9

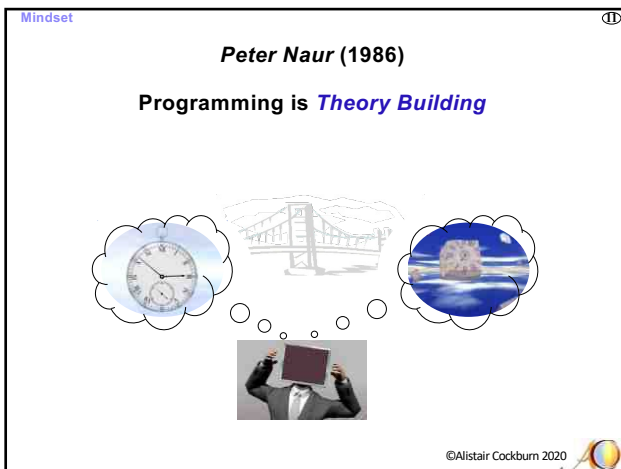
The situations **never repeat!**

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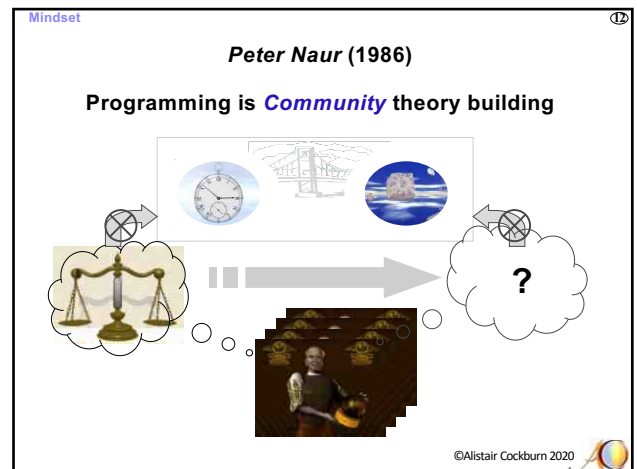
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Mindset 13

**Peter Naur (1986)**

Programming is community theory building  
**Communicate** the theory to the **next person!**

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Mindset 14

**COMMUNICATION** is  
 touching into *shared experience*

As you share *more experiences*, you can  
*write less ...*

As you share *fewer experiences*, you must  
*write more !*

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Mindset 15

**Face-to-face** is the most effective -  
 Try **video !**

Communication Effectiveness

Richness of communication channel

Paper (No Question-Answer)

2 people on chat

Audiotape

Videotape (Question-and-Answer)

2 people on phone

2 people at whiteboard

(Courtesy of Thoughtworks, Inc.)

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Mindset 16

Speed the team by **aligning** goals

Normal team

Aligned team

(Dirty Dozen)  
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Mindset 17

**Amicability** speeds information flow

Amicability = Willingness to listen with good will

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Mindset 18

**People** issues determine a project's **speed**

Can they easily **detect** something needs attention?  
 (Good at Looking Around)


Will they **care** enough to do something about it?  
 (Pride-in-work; Amicability)

Can they **effectively** pass along the information?  
 (Proximity; face-to-face; convection currents)

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Mindset

Crystal's Genetic Code 


Mindset Design priorities Project properties Key Techniques Design principles Samples

Software development is a **Cooperative Game** of **Invention** and **Communication**

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Design priorities


Crystal's Genetic Code 

Mindset Design priorities Project properties Key Techniques Design principles Samples

Project **Safety**


Development **Efficiency**

Process **Habitability**

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Project properties

Crystal's Genetic Code 

Mindset Design priorities Project properties Key Techniques Design principles Samples

The Seven Properties of Successful Projects

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Project properties

Seven Properties of Successful Projects

1 Frequent delivery

2

3


4

5

6

7

Have you delivered running, tested, **usable** functions to your users at least **twice** in the last six months?

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Project properties

Seven Properties of Successful Projects

1 Frequent delivery

2 Reflective improvement

3


4

5

6

7

Did you get together within the last **month** to discuss and **improve** your group's working habits?

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Project properties

Seven Properties of Successful Projects

1 Frequent delivery

2 Reflective improvement

3 Close communication

4

5

6

7

Does it take you under **30 seconds** to get your question to the attention of the person who might have the answer?

Do you **overhear** something relevant from a conversation among other team members **every few days**?

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Project properties

### Seven Properties of Successful Projects

Reflective improvement 2    Close communication 3

Frequent delivery 1

Can you give your boss **bad news**?

Can people end long debates about each other's designs with **friendly disagreement**?

4 Personal safety

7    5

6

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Project properties

### Seven Properties of Successful Projects

Reflective improvement 2    Close communication 3

Frequent delivery 1

Does each person know what their **top two** priority items are?

Are they guaranteed at least **two days in a row with two uninterrupted hours each day** to work on them?

4 Personal safety

7    5 Focus

6

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Project properties

### Seven Properties of Successful Projects

Reflective improvement 2    Close communication 3

Frequent delivery 1

Does it take less than **three days** from when you have a question to when an **expert user** answers it?

... a few hours?

4 Personal safety

7    5 Focus

6 Easy access to expert users

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Project properties

### Seven Properties of Successful Projects

Reflective improvement 2    Close communication 3

Frequent delivery 1

Do your developers **use** the configuration management system?

Are your tests **automated**?

Do you integrate the system at least **twice / week**?

4 Personal safety

7 Technical environment

5 Focus

6 Easy access to expert users

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Project properties

### Seven Properties of Successful Projects

Reflective improvement 2    Close communication 3

Frequent delivery 1

4 Personal safety

7 Technical environment

5 Focus

6 Easy access to expert users

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Design principles

### Crystal's Genetic Code

Mindset    Design priorities    Project properties    Design principles    Key Techniques    Samples

Every project is **different** ...

We need a **family** of **tunable** methodologies,

... each satisfying the **design priorities** and **project properties**.

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Design principles 31

### Crystal uses 7 design principles

- **Face-to-face** communication is most efficient.
- Methodology **weight is costly**.
- **Add weight** with project size and distance.
- **Add ceremony** with project criticality.
- **Add feedback & communications**  
to reduce intermediate deliverables.
- **Add discipline, skills, understanding**  
to offset process, formality, documentation.
- Trade efficiency at **non-bottleneck stations**.

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Design principles 32

### A “methodology” is nothing more than **the conventions** people agree to follow !

They naturally drift over time

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Design principles 33

### Revisit your conventions **every month**

**Number of people coordinated**

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Design principles 34

### How do we make methodology construction so **cheap** that we can reconstruct it **each month**?

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Design principles 35

### Answer : The **Reflection technique**

Keep These	Try These

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Techniques 36

### The reflection workshop takes an **hour / month**


1. **Hang** a 2-column flipchart
2. **Fill in** the chart (30 - 60 minutes)
3. **Post !** the chart in a frequently seen place
4. **Use !** the ideas
5. **Repeat !** each month

<b>Keep these</b> test lock-down quiet time daily meetings	<b>Try these</b> pair testing fines for interruptions programmers help testers
<b>Problems</b> too many interruptions shipping buggy code	

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Techniques 37

**Crystal's Genetic Code** 

Mindset      Samples  
Design priorities      Design principles  
Project properties      **Key Techniques**

**Any technique is OK !**

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Techniques 38

Some **“interesting”** techniques are documented


**Reflection Workshop**

Methodology Shaping	Exploratory 360°
Blitz Planning	Early Victory
Delphi Estimation	Walking Skeleton
Daily Stand-ups	Incremental Rearchitecture
Agile Interaction Design	Information Radiators
Process Miniature	
Side-by-Side Programming	
Burn Charts	

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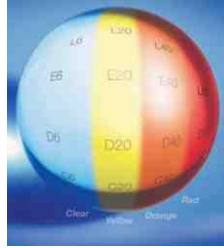
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Design principles 39

**Crystal is a family** 

Criticality (defects cause loss of...)


Life (L)	L6	L20	L40	L100
Essential money (E)	E6	E20	E40	E100
Discretionary money (D)	D6	D20	D40	D100
Comfort (C)	C6	C20	C40	C100
	Clear	Yellow	Orange	Red
	1 - 6	- 20	- 40	- 100
	Number of people involved			



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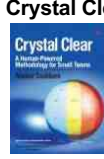



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Samples 40

**Crystal's Genetic Code** 

Mindset      Samples  
Design priorities      Key Techniques  
Project properties      Design principles

**Crystal Orange/web**

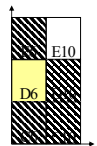
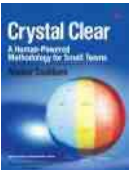
 <b>Crystal Clear</b> 1998	 <b>Agile Software Development</b> 2006	 <b>Surviving Object-Oriented Projects</b> 1994	 <b>Agile Software Development</b> 2001
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Samples 41

**Crystal Clear** is for **3-10 co-located** people

 <p><b>Seating</b> single big room (or adjacent offices)</p> <p><b>Teams</b> single team of designer-programmers</p>	<p><b>Required Roles</b> sponsor senior designer designer/programmer user (part-time)</p> <p><b>Combined Roles</b> coordinator business expert requirements gatherer</p>	
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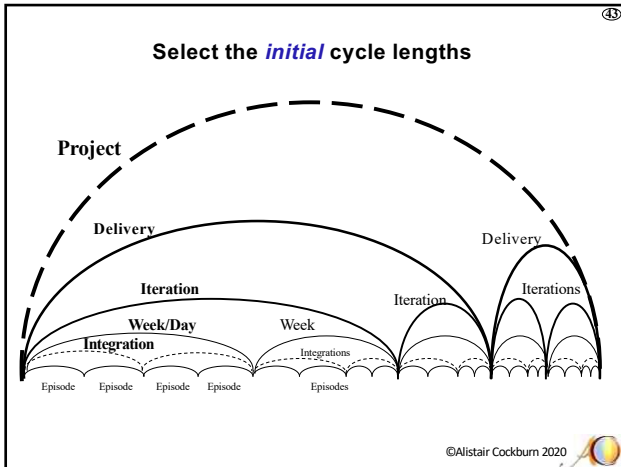
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How do I get started with Crystal ?

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Establish the *first 3 properties*

**Frequent Delivery** : every month or two

**Osmotic Communication** : sit next to each other

**Reflective Improvement** : workshop monthly

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Stay in *good-humored communication*

Add ...

- Personal Safety**
- Focus**
- Easy Access to Expert Users**

- **Configuration management**
- **Automated testing**
- **Frequent integration**

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**Reflect** monthly

<p><b>Keep these</b></p> <p><i>test lock-down</i></p> <p><i>quiet time</i></p> <p><i>daily meetings</i></p>	<p><b>Try these</b></p> <p><i>pair testing</i></p> <p><i>fines for interruptions</i></p> <p><i>programmers help testers</i></p>
<p><b>Ongoing Problems</b></p> <p><i>too many interruptions</i></p> <p><i>shipping buggy code</i></p>	

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Crystal's genetic code.

<p><b>Mindset</b></p> <p><b>Cooperative game of invention and communication</b></p>	<p><b>Design Principles</b></p> <p>7, including</p> <p>face-to-face</p> <p>concurrent development</p> <p>reflective tailoring</p>
<p><b>Design Priorities</b></p> <p>Project <b>safety</b></p> <p>Development <b>efficiency</b></p> <p>Developer <b>habitability</b></p>	<p><b>Techniques</b></p> <p>Discretionary</p> <p>with a starter set</p>
<p><b>Project Properties</b></p> <p>Frequent <b>delivery</b></p> <p>Close <b>communication</b></p> <p>Reflective <b>improvement</b></p>	<p><b>Design Samples</b></p> <p>Crystal <b>Clear</b></p> <p>Crystal <b>Yellow</b></p> <p>Crystal <b>Orange</b></p> <p>Crystal <b>Orange-web</b></p>

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