

Case Study: Guess My Robot

Yishay Mor,
London Knowledge Lab
Chais 2007, *Games for
learning: a Design Pattern
Approach*

Summary

- Game in which children (age 10-14) exchange number sequence challenges across Europe
- Part of the WebLabs project (<http://www.lkl.ac.uk/kscope/weblabs/>), 2002-2005
- Tried, tested, reported, inspired.

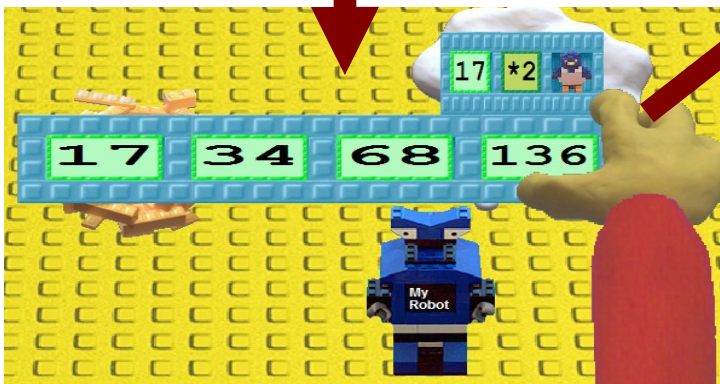
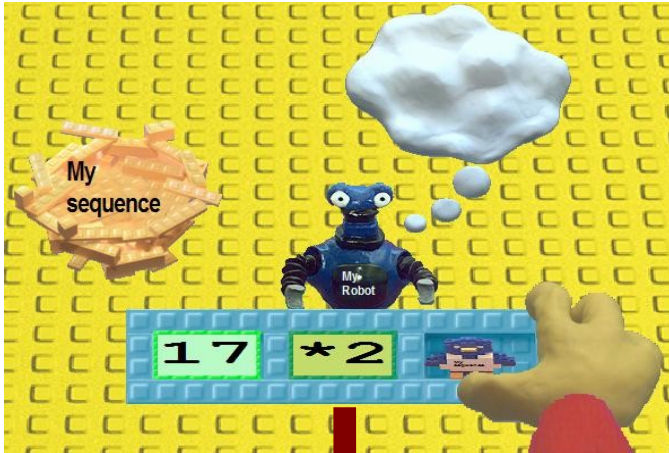
Context

- Developed and tested in the course of the WebLabs project number sequences activity strand.
- Follows basic activities which introduce programming and maths skills.
- Small groups of children age 10-14, distributed across Europe.
- Uses ToonTalk programming and Webreports on-line collaboration.

Aims

- Hone ToonTalk programming skills.
- Develop an aptitude for constructing, manipulating and analysing number sequences.
- Establish norms of mathematical argumentation and debate.
- Have fun.

Proposers



Guess my Robot

Created by [yish](#) - Topic Group: [Sequences](#) - Created: 28-11-06 - Modified: 28-11-06

Yishay's [Guess My Robot Page](#)

My Sequence:

17 34 68 136

Solution:

After someone posts a Robot that generates your sequence, mention him / her and post your original robot here.

Can you explain?
 What if...
 I have a conjecture...
 This doesn't work because...
 Try this instead...
 Other:

Responders

Guess my Robot

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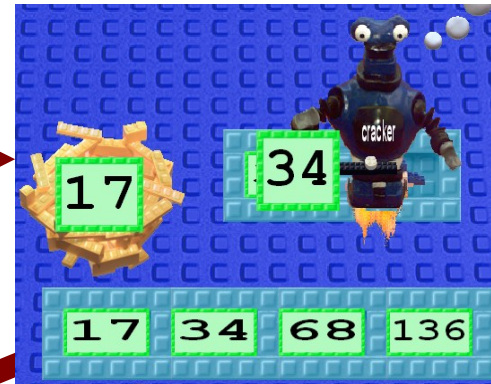
My Sequence:

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Solution:

After someone posts a Robot that generates your sequence, mention him / her and post your original robot here.

Can you explain?
 What if...
 I have a conjecture...
 This doesn't work because...
 Try this instead...
 Other:



And then..

Comment

I try explain

Posted by: Rita at 23-02-04

To create my sequence I thought thus: My first term is 2 and each one of the other terms is gotten of the previous one adding 2 and multiplying 4 to the result.

I created a box with thesecond hole I put hole I put the numt hole I put a bird. I g thought.

In the robot though the bird, I copied wi hole, I copied with n Esc and I left the rol

I cleaned the first nu robot... And my sequ

Comment

my response

Posted by: Rita at 30-03-04

Congratulations, you found a solution for mysequence!

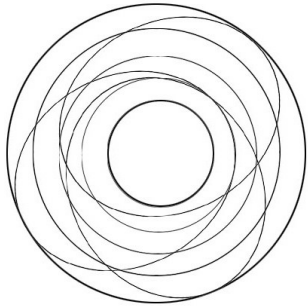
But you used a different procedure of mine. I made thus:



I can prove that my sequence and your sequence are equal with the process of algebraic representation used by Sofia group.

Results

- Students constructed and analysed sequences of growing complexity, much beyond the curriculum.
- Engaged in discussions on mathematical equivalence, proof, etc.
- Built competence which proved valuable in later activities.



Design Pattern: Guess My X

Summary

- *'I created something, you have to figure out how'.*
- Derived from Guess my Robot, Guess my Garden, Guess my Graph.
- Attack process-product gap.

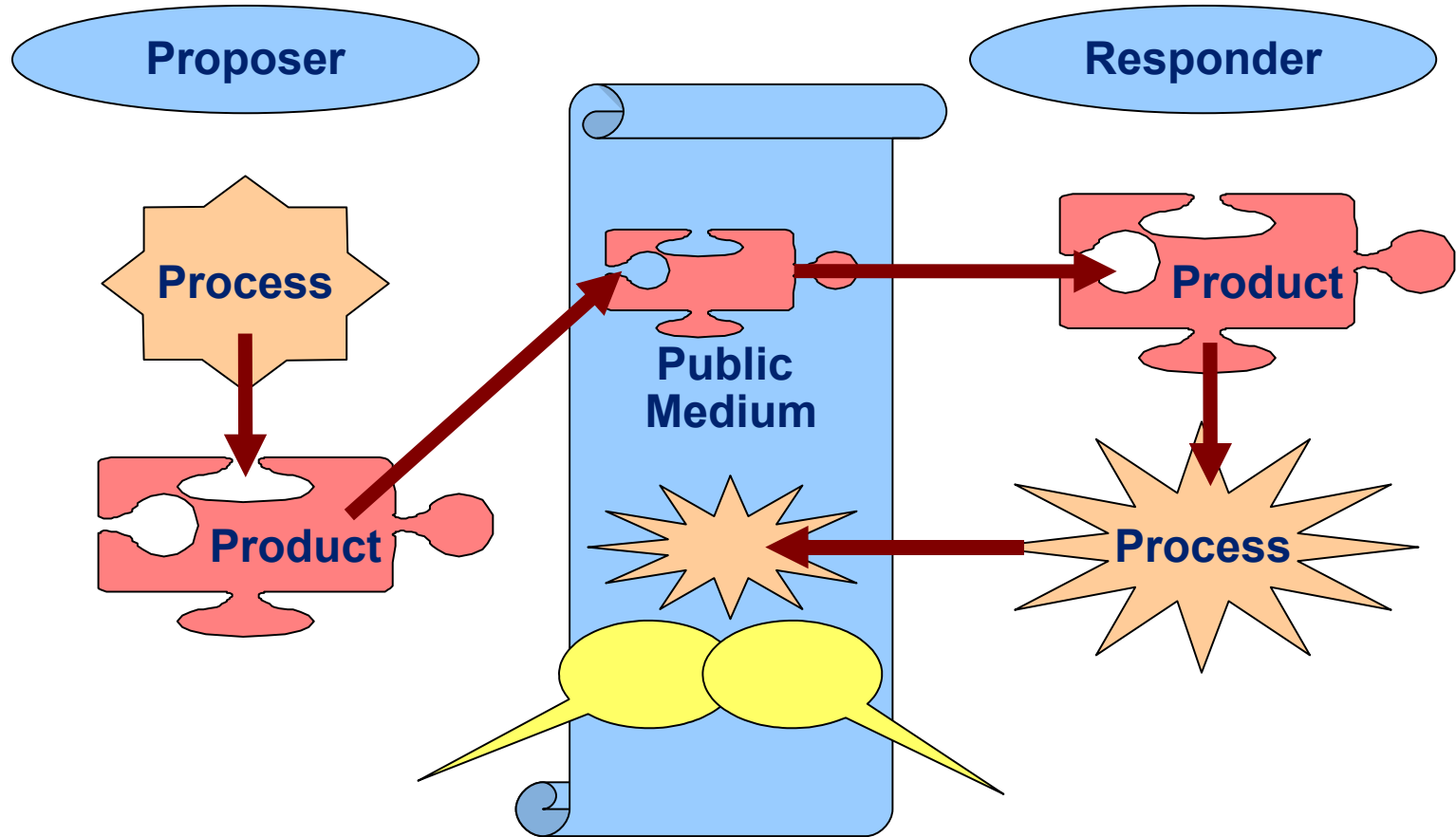
The problem / intent

- Initiating and sustaining a mathematical discussion in a learning community is vital to the establishment of socio-mathematical norms and to the collaborative construction of knowledge in the community.
- We address this by **A Challenge exchange** game of **Build this** puzzles, using a **League chart** to facilitate the game.

Context

- Assumes a degree of social and technical sophistication.
 - suitable for young teens and above.
 - Can be adapted for younger children.
- Requires flexibility in time to allow learning dynamics to emerge.
 - can be interleaved with other activities.
- Suitable for concrete, well-bounded content domains, such as computation, modelling or analysis.
 - Uses these as a strata for developing meta-cognitive skills.

The pattern



The pattern

A **Challenge exchange** game

- Encourage discussion and collaborative learning
- Break down classroom hierarchies.

Of **Build this** puzzles

Engender reflection and discussion about the relationships between mathematical objects and the processes that produce them.

Using a **League chart** to facilitate social interaction.

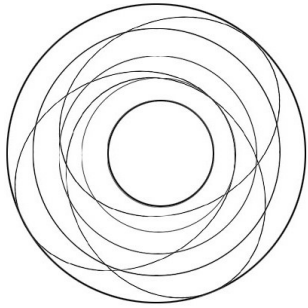
Proposers construct a process, and post the product it outputs as a challenge.

Responders need to reverse engineer the process from the product and, if successful, post it as a response.

Leads to discussions of issues such as proof, equivalence and formal descriptions. The quality and extent of these discussions depends on the scaffolding and provocations provided by the teacher.

Related patterns

- **Leads to:** Implementing a Behavior, Post ludus
- **Elaborates:** Challenge Exchange; Build this
- **Follows:** sugar-coating (anti-pattern)



Case Study: Mathionaire in Christopher Hatton



Context

Stacey is a year 4 (age 9) teacher in a primary school in inner London.

She is especially fond of Mathematics, and tries to encourage what she calls "mathematical talk".

She is eager to integrate new tools in her teaching and is willing to experiment together with her students.

She does not have any advanced training in Maths education and educational technologies.

Aims

- To engage students in an debate of mathematical claims using mathematical arguments.
- Warm-up / cool-down of maths lesson.
- A bit of excersize.

Details

1,000,000
500,000
250,000
125,000
64,000
32,000
16,000
8,000
4,000
2,000
1,000
500
200
100

Who wants to be a Mathionaire?

Are you sure?

Yes No

50:50

Take 500

How many grams are there in $1\frac{1}{4}$ kg?

A 1250g B 1340g

C 1075g D 1750g

The twist

- Display it on the whiteboard. Students raise their hands to answer the questions.
- Stacey chooses a student and he or she responds, the rest of the class is given a chance to object to the answer.
- If no hands are raised, she enters the response into the game interface, and proceeds to the next question.
- If students raise their hands to object, Stacey facilitates a discussion between an objector and the original responder.
- After the students argue for their solutions, Stacey lets the class vote between them and enters the majority solution into the software.

Points to notice

- Using the quiz provides the teacher with a ready-made set of questions to provoke discussion.
 - preparing such a set to have at hand would be infeasible for many teacher, simply due to time pressures.
- Using the quiz mechanism to display questions frees the teacher from technical duties and allows her to focus on the students.

Points to notice (II)

- Driving the flow and speed of the game by students' objections allows her to monitor the class's ability and difficulties.
 - Having the software judge the answers dissolves the class power structure and eliminates tensions; it is not the teacher who found you wrong.
- The different roles in the game (responder, objector, voter) allows students to engage at the level of participation they are comfortable with, so that even peripheral participants are intent and focused on the discussion.

Design Patterns?

- Your turn