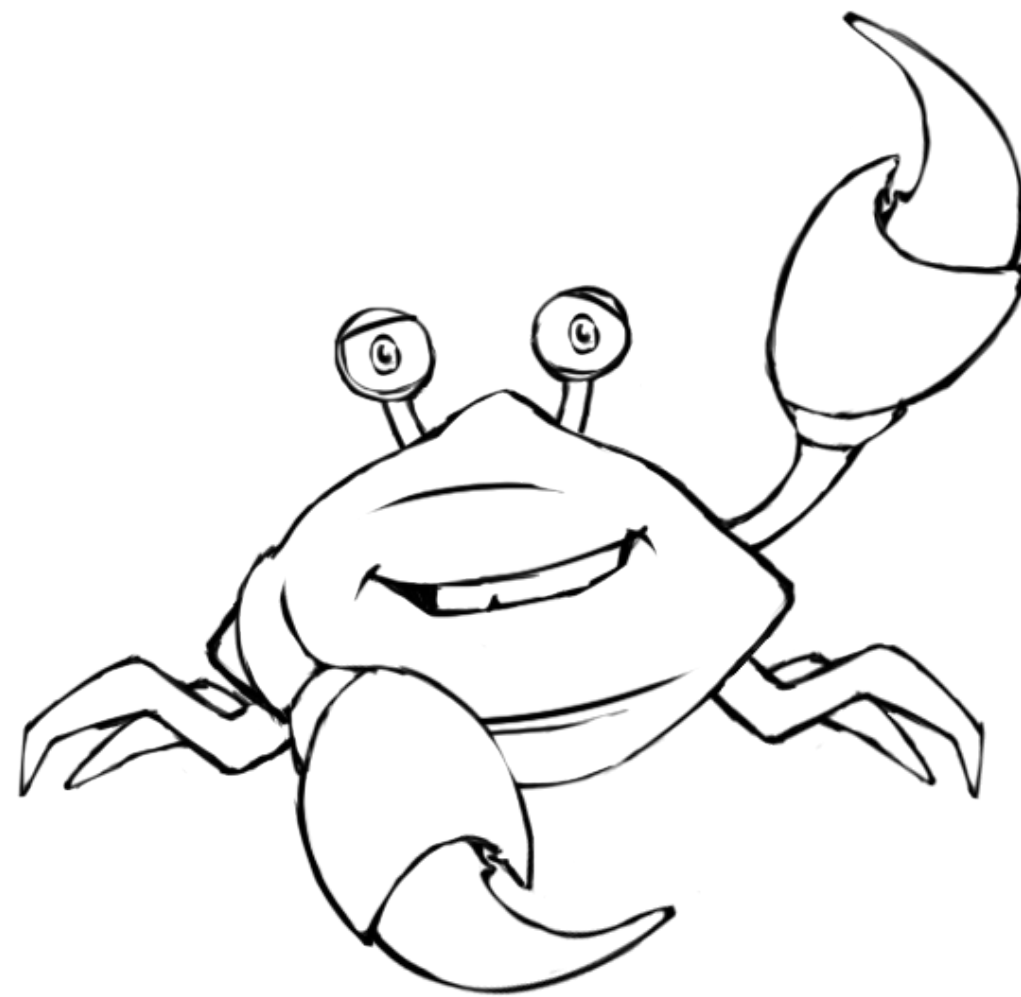


Scenario Week 2

COMP214P

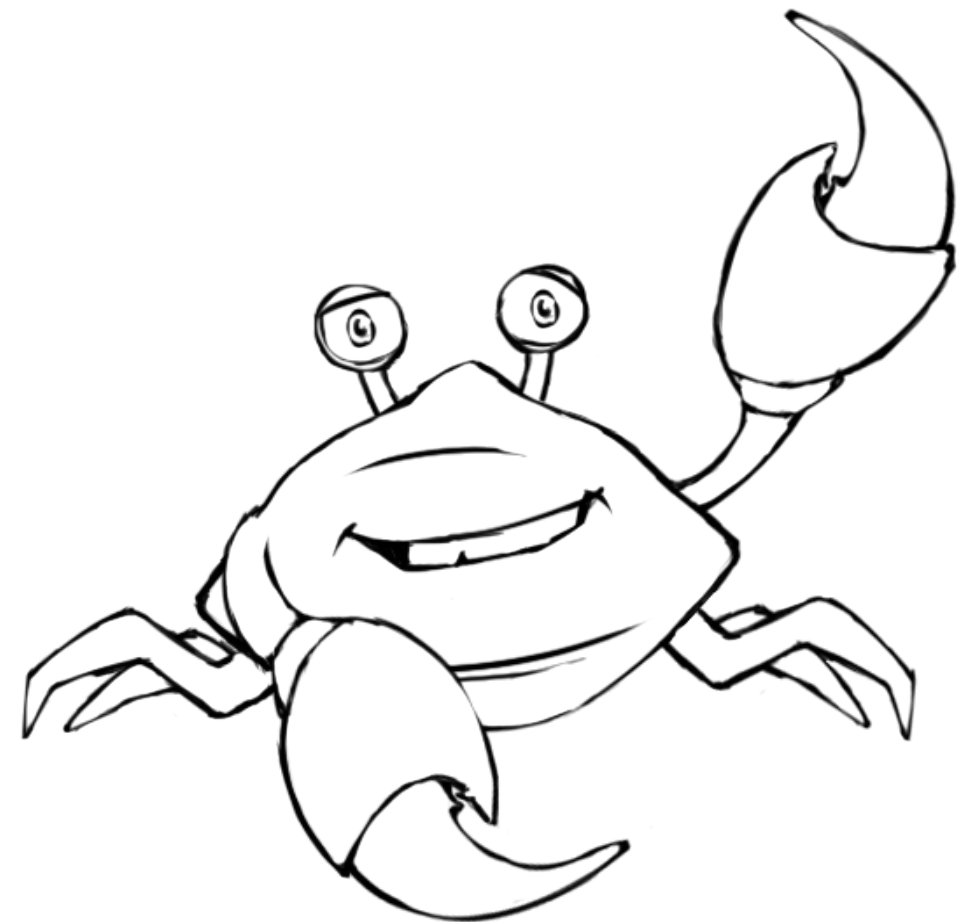
`scenario@cs.ucl.ac.uk`

11–15 December 2017

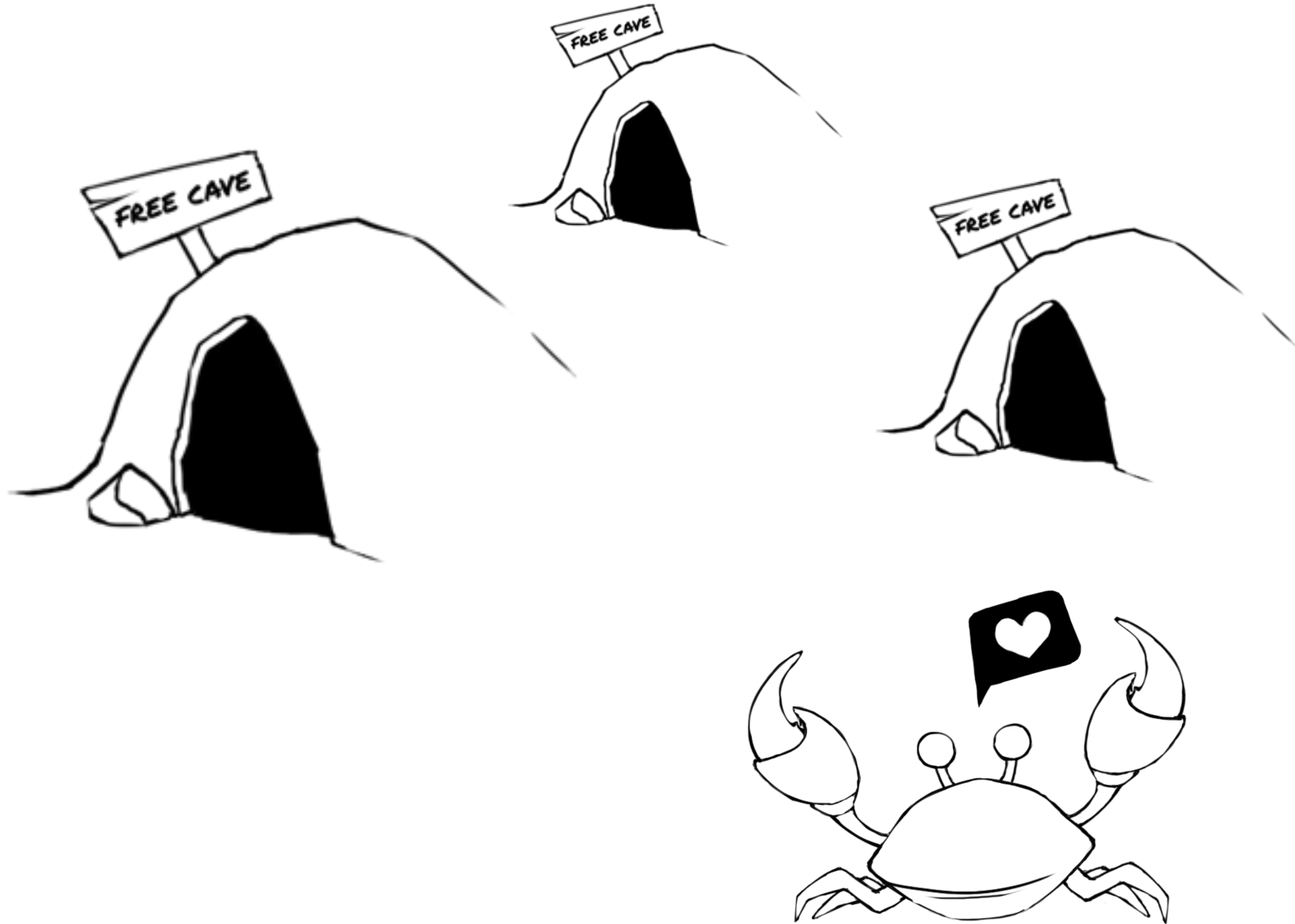


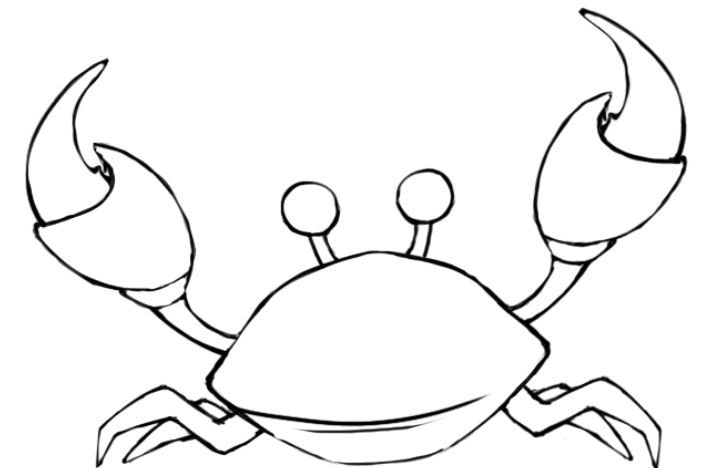
Torpe

(the prosperous crab)

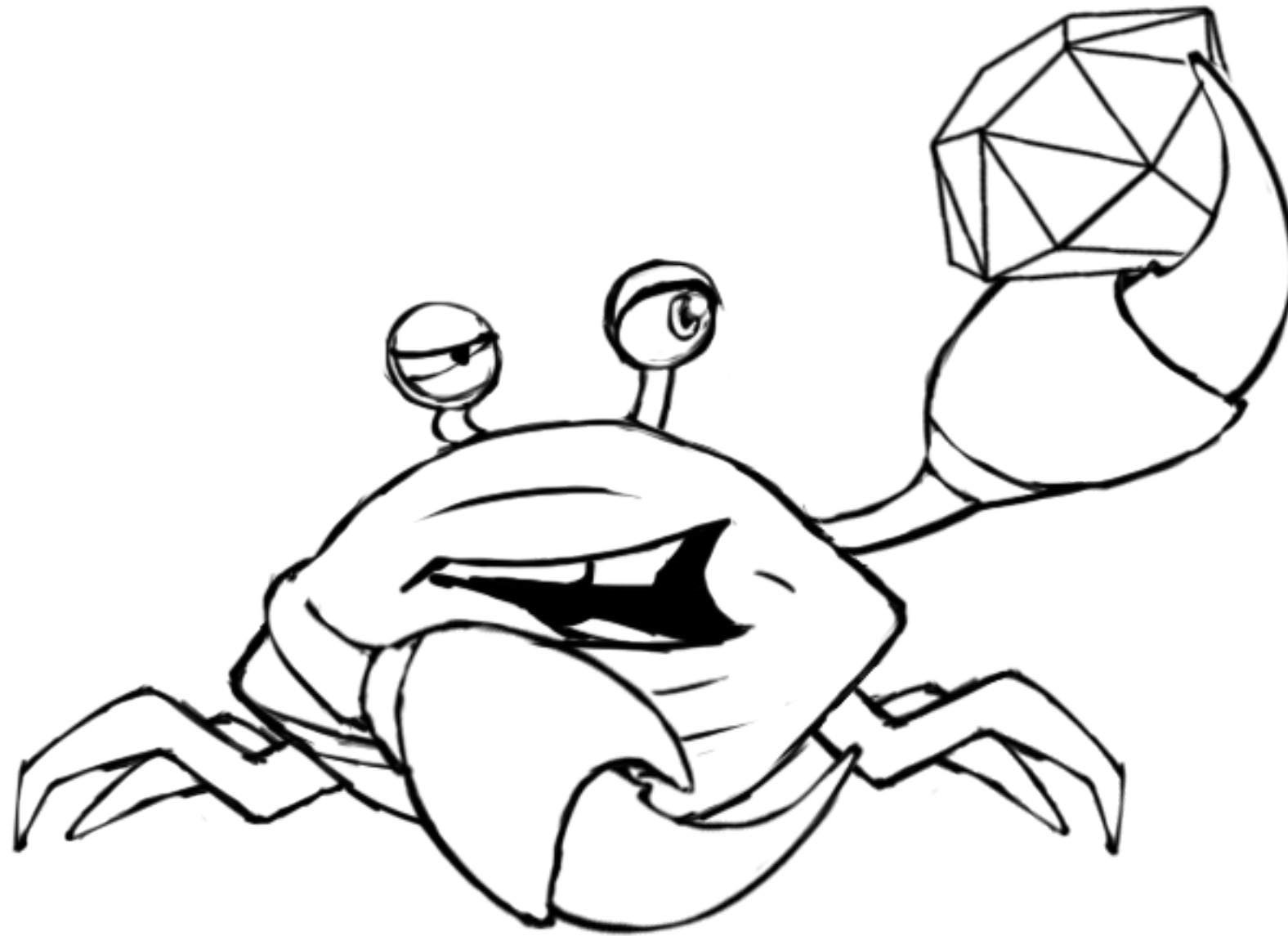






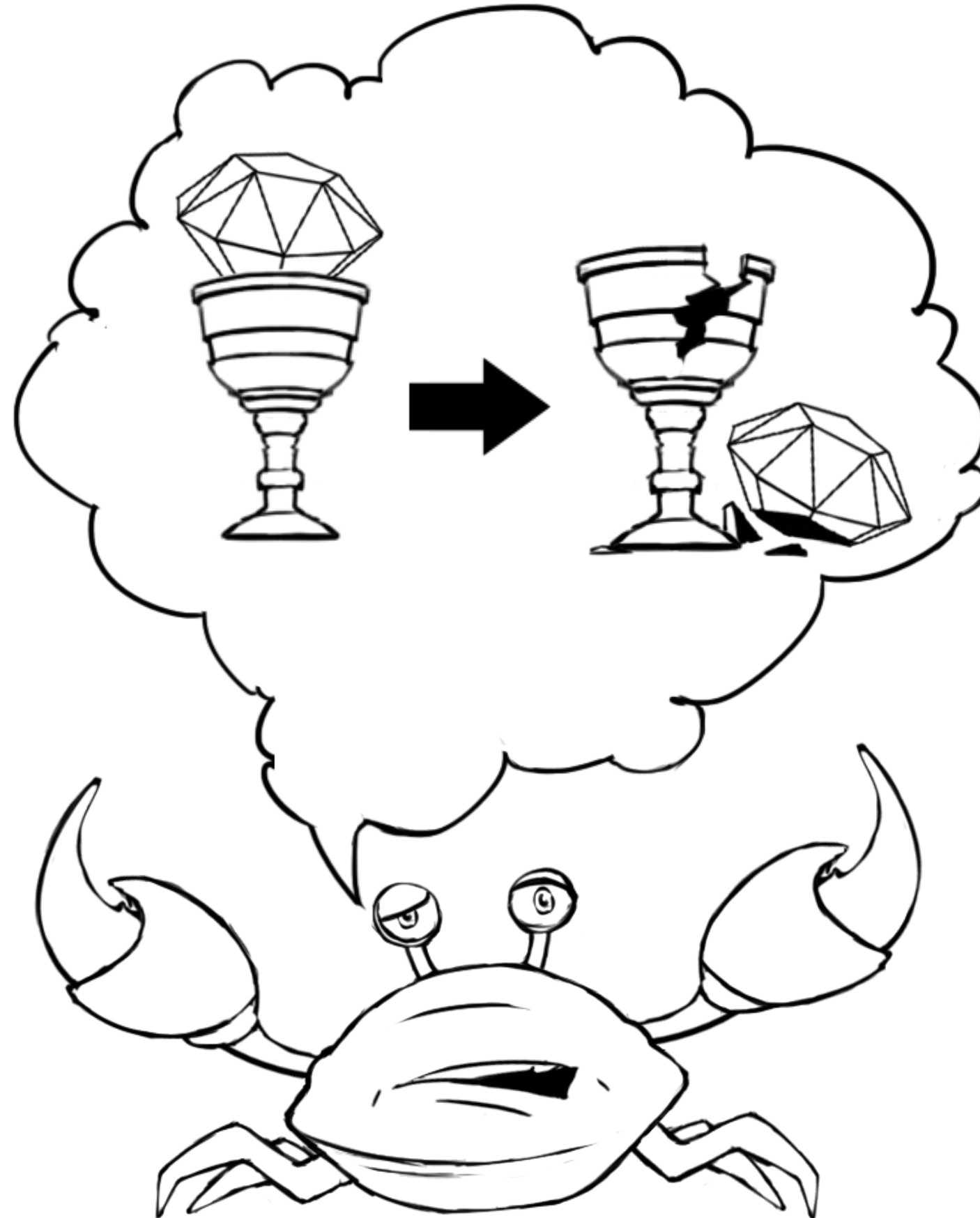


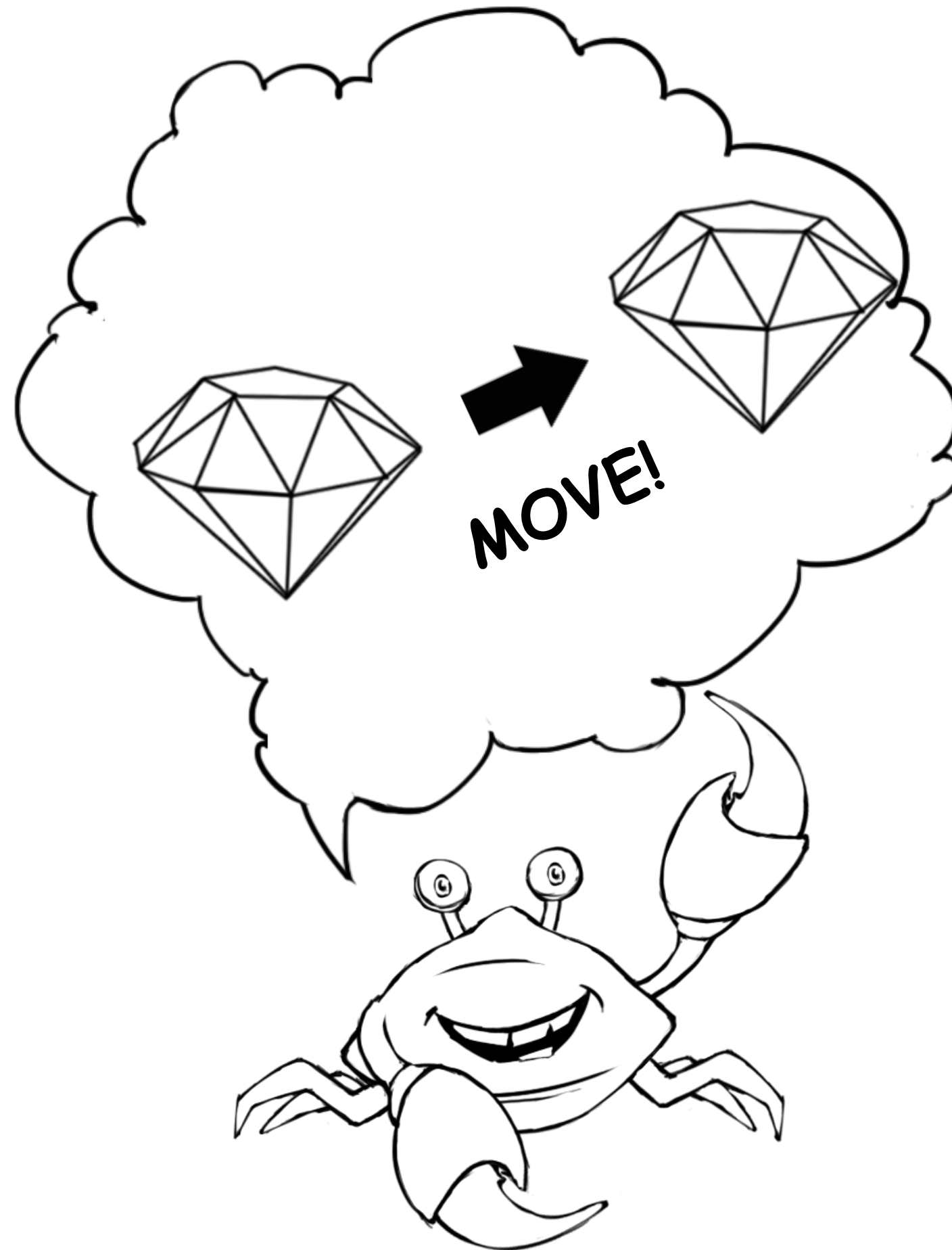
How to Furnish a Room

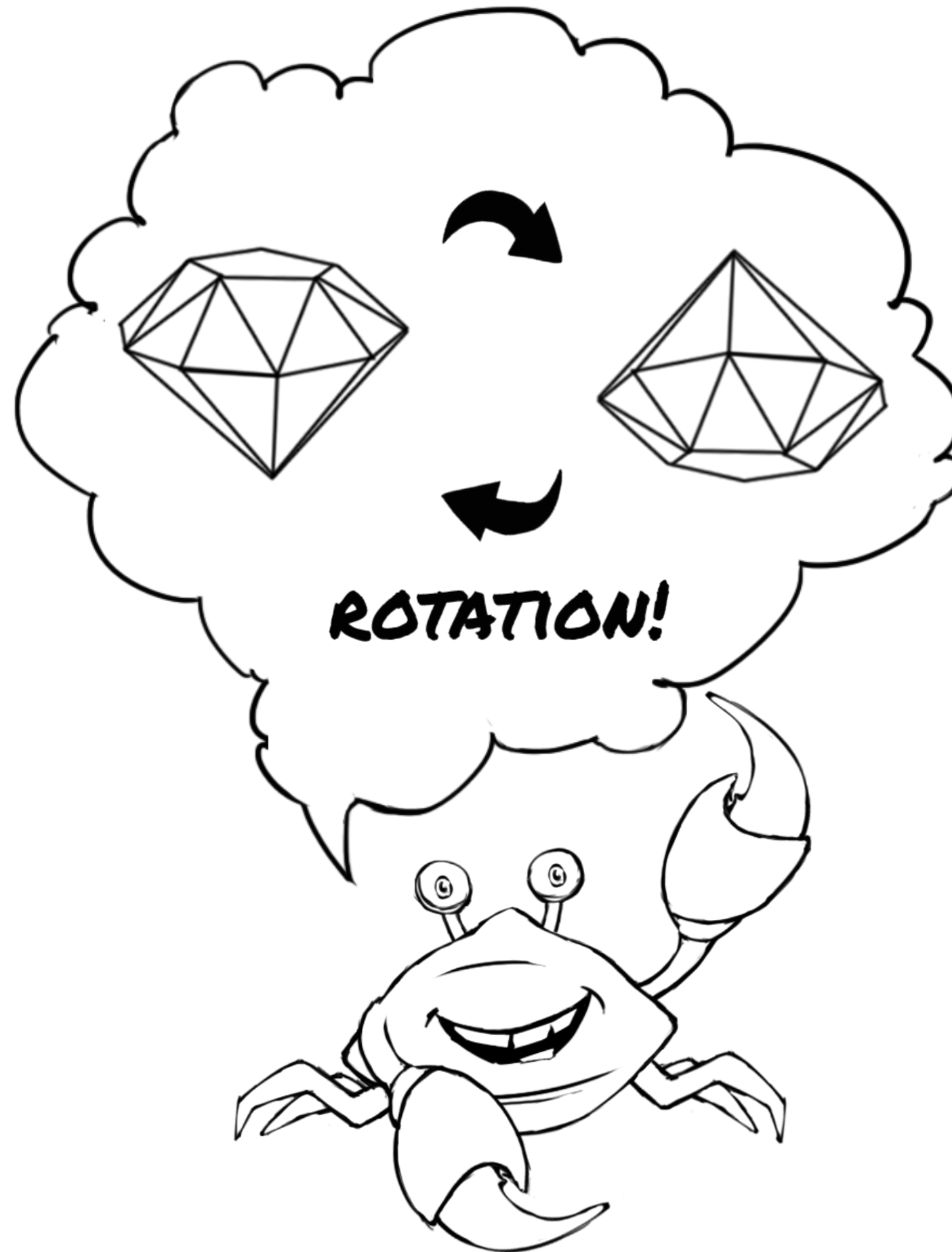












This Week

Home	Start Here	1: Intro to HCI	2: Gathering Requirements	3 and 4: Sketching and Prototyping	5: Accessibility	6: Representing Users	
7: Design Principles	8: Evaluation	HCI Assignment	Scenario Week 3 (30th Oct to 3rd Nov)	Bi-Weekly Reports	FAQs	Resources	Project Submission
IEP/CS Legal Implications		Technical Communication Assignments		Scenario Week 2 (11-15 December 2017)			

Scenario Week 11-15 December 2017

The second Scenario Week is going to be dedicated to an algorithmic challenge involving implementation of mathematical procedures and approaching an open-world optimisation problem.

You will work on the scenario in small teams of 3-4 people. Please, choose your team on the choice page below **by Thursday, December 7, 12:00 (noon)**.

The week will involve **a lot** of coding and algorithm design, so please, make sure that your team has one or more skilled programmers. You should expect to arrange the workload so different team member would work on different subtasks in parallel, synchronising via a repository. The programming language is not important and the choice is entirely up to you.

The week starts at the Introductory Session **at 10am on Monday December 11** in the Darwin Building B40 LT. You must attend this initial session.

Materials for the Scenario Week



[problems.rfp](#) 1.2MB Text file

A file with Room Furnishing problems



[Room Furnishing Assignment](#) 695.5KB PDF document

Useful Resources



[geometry-intro](#) 1.3MB PDF document

Geometric Algorithms



[2d-transform](#) 1.7MB PDF document

2D Geometrical Transformations (Slides)

Assessment



[Booking a slot for Visualisation Demo, 15 December 2017 \(one per team\)](#)



[Scenario Week 2 Report](#)

Not available unless: You belong to any group



[Scenario 4 Group Selection](#)

Select the group you want to be part of by Thursday, December 7, 12:00 (noon). Groups are of size three or four.

Room Furnishing Problem

Put furniture pieces *within a room*,
without them *overlapping*,
using each item *at most once*,
trying to *maximise* their overall cost.

- Complexity-wise, harder than
 - SAT
 - Travelling salesman
 - Hamiltonian paths
 - Knapsack problem

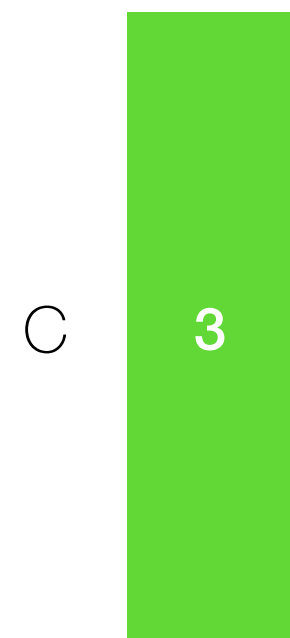
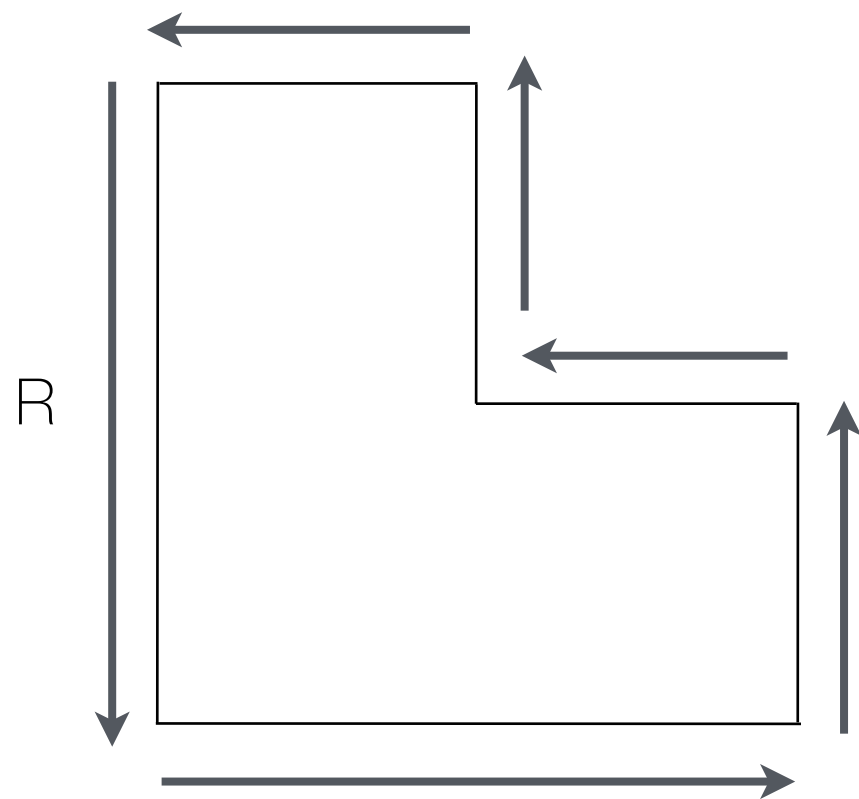
NP-complete

Task 1: Computing the best RFP solutions

- **30** instances with obstacles of different shapes;
 - File with instances: **problems.rfp** (see Moodle page);
 - Room sizes: 4–250 vertices;
 - 40–500 furniture pieces of various shapes;
- Compute a *valid* set of furniture locations for *each problem instance*;
- Grading: **60 points**, *two per instance*, for *any valid* solution.

Encoding of the problems

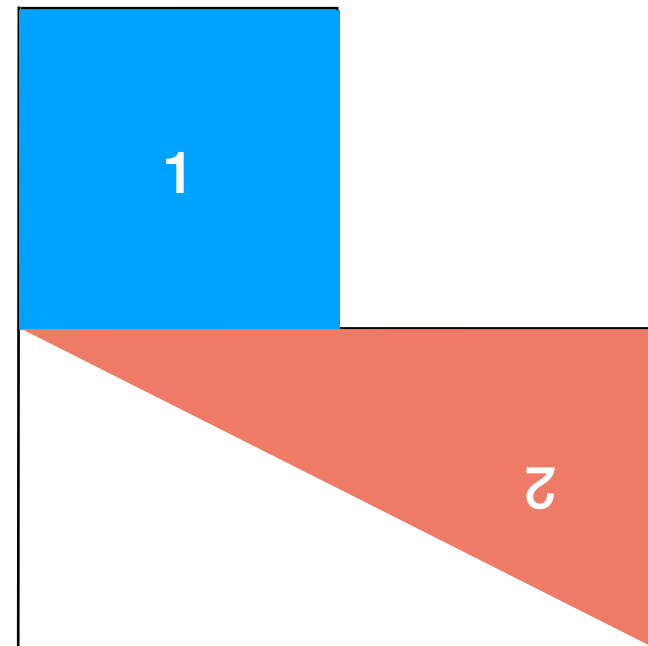
problems.rfp



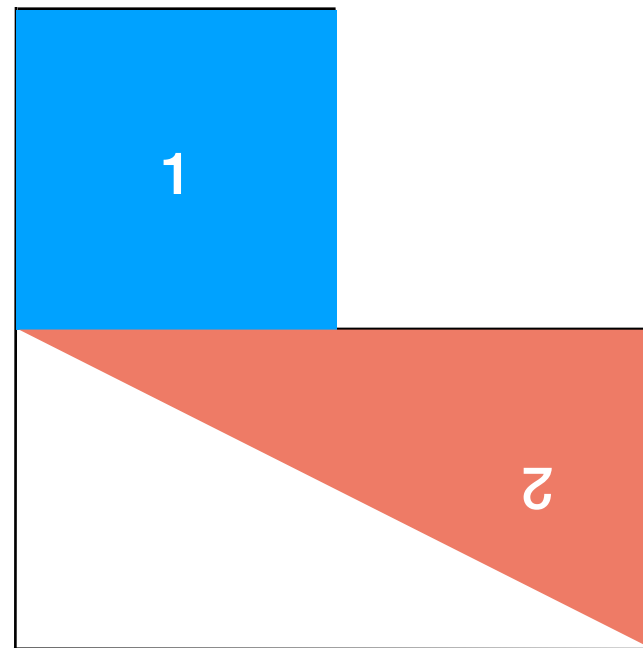
1: $(0,0), (2,0), (2,1), (1,1), (1,2), (0,2)$ # 1: $(0,0), (1,0), (1,1), (0,1)$; 2: $(0,0), (2,0), (0,1)$; 3: $(0,0), (0.5,0), (0.5,2), (0,2)$

R A B C

A Solution



Encoding your solutions



team name

alarcon

1t239vshriskq

1: (2,1), (0,1), (2,0); (0,1), (1,1), (1,2), (0,2)

team's password

problem number

per-instance furniture positions

Checking and submitting solutions

- **Warning:** *double-precision floating-point* arithmetic
 - all equalities are up to $\epsilon = 0.000,000,001$
- Details on acceptance criteria are in the [specification](#) (on Moodle)
- Submit your solutions here:

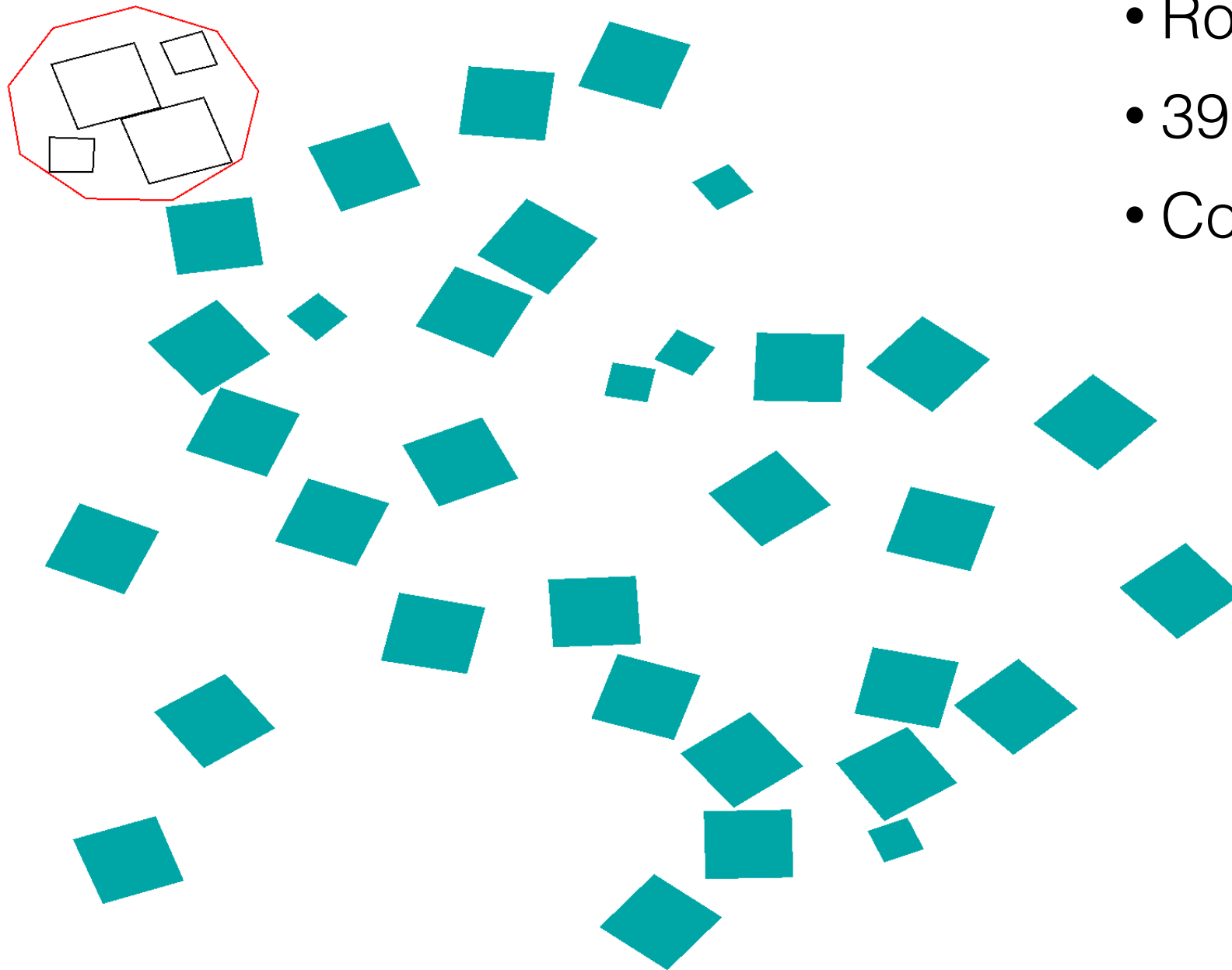
<http://scenario.cs.ucl.ac.uk>

Solutions are accepted until 14:00 GMT 15 Dec 2017

Task 2: Visualisation

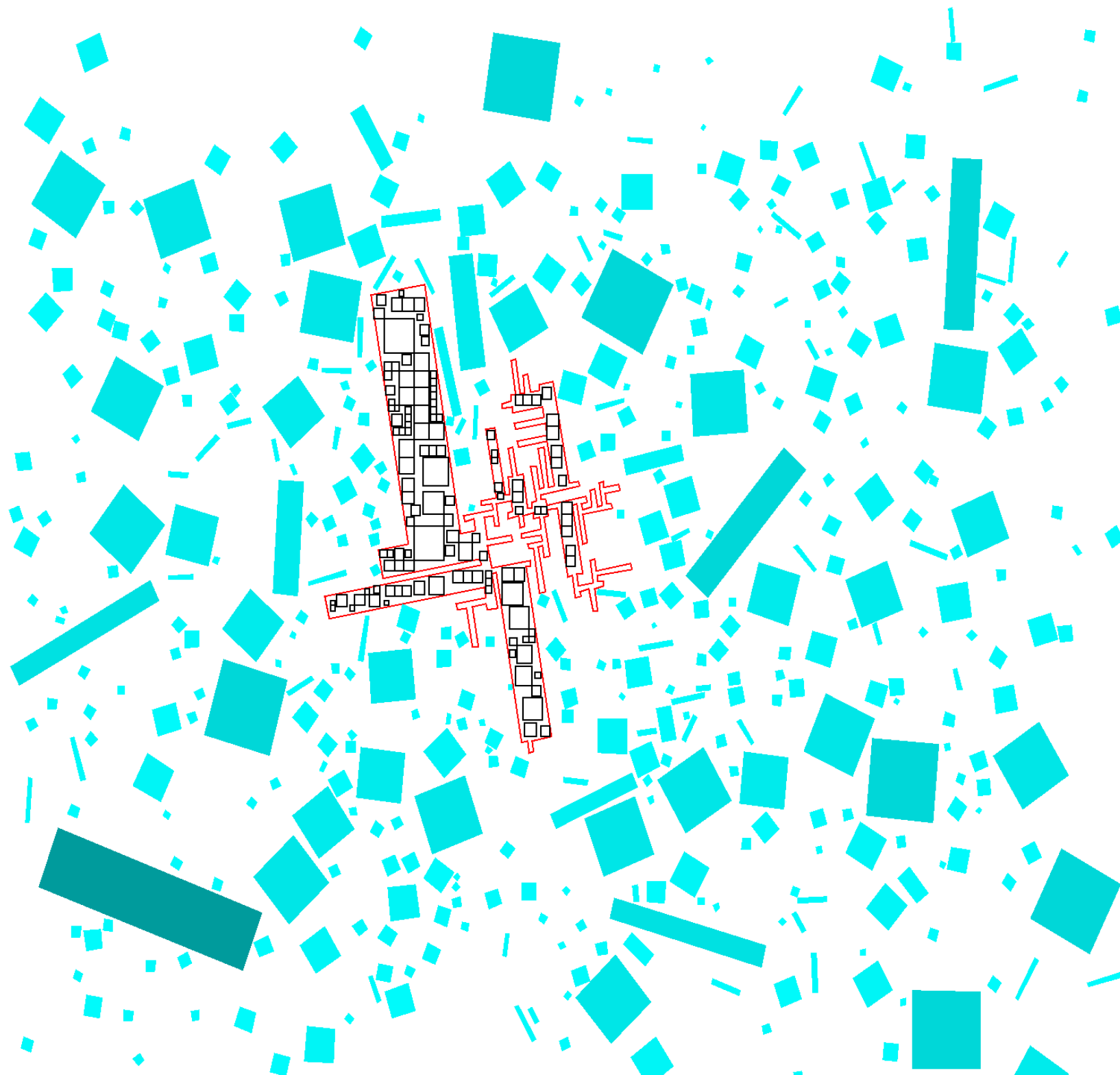
- Implement a visualiser for rooms and furniture locations:
 - drawing room shapes;
 - showing by colour different unit costs of furniture items;
 - drawing remaining unused furniture;
 - drawing selected furniture items within the room.
- Grading: **10 points**
- Assessed by the organisers from **14:00 till 17:00, 15 Dec**
 - **book a slot for your team!**

Our Solution (intentionally suboptimal)



- Room size: 9
- 39 furniture pieces
- Coverage: 40%

Our Solution (intentionally suboptimal)



- Room size: 180
- 500 furniture pieces
- Coverage: 46%

Task 3: Implementation report

- Describe your implementation experience
 - language, tools, algorithms, heuristics, *etc.*
 - details in the specification (see Moodle)
- Grading: **10 points**
- Submit on Moodle by **17:00, 15 Dec 2017** (one per team)

Task 4: The Competition!

- Compete with other teams for the *best* RFP solutions
- Check the score table <http://scenario.cs.ucl.ac.uk> for details
- Grading: up to **20 points**.

$$\textit{Reward}(\text{team}) = \mathbf{20} - \min(\mathbf{20}, \textit{rank}(\text{team}) - \mathbf{1})$$

Overall grading

Task	Max grade
Computing valid RFP solutions	60
Visualisation of the solutions	10
Implementation report	10
The Competition	20

This week schedule

	Monday 11 Dec	Tuesday 12 Dec	Wednesday 13 Dec	Thursday 14 Dec	Friday 15 Dec
10:00-11:00	Darwin Building B40 LT	Darwin Building B15		Student Central - 1st Floor - The Venue	IOE - Bedford Way (20) - 802
11:00-12:00					
12:00-13:00	Gordon House 106				
14:00-16:00					IOE - Bedford Way (20) - 104 - Elvin Hall
16:00-17:00		Medawar Building G02 Watson LT		Birkbeck Malet Street B36	
17:00-18:00					

Helpdesk (green) — time and location where the staff and/or TAs will be present to answer your questions

Lectures (blue) — introductory and concluding lectures

Demonstration (red) — checking the visualisation of the algorithms by the staff and TAs (book your slot!)

Good luck!

