

CS4221 - Foundations Computer Science

Prof. Conor Ryan

<http://193.1.101.7/4221>

Conor.Ryan@ul.ie

Always put [CS4221] in the subject line of mails

Contact Details

- E-mail : Conor.Ryan@ul.ie
- Office : CS1013
- Phone : 2755
- Class web site <http://193.1.101.7/4221>
- Office hours : Wednesday 2-3
- Lectures:
 - Monday 12PM-2PM (CSG001)
 - Thursday 11AM-1PM (CSG001)

Course Content

- Representation of tasks/problems
- Represent them such that computer can solve problems
- Problem Solving
 - What is the real problem?
 - Salary system - calculation
 - Game - graphics, intelligence etc.
 - How do I tell a computer how to solve it?
 - How do I design a program that can't be tested?

- Programming concepts
 - What program is doing
 - NOT concerned with how it is doing it
- Describe problem in mathematical form
 - Why? Concise and clear
- How important is maths?
 - Not very
 - Use mathematical terms/ideas

- **Syntax**
 - What the program looks like
- **Semantics**
 - What the program **does**

Tiziana's Beans

Empty contents
into
microwaveable
container and
cover

Heat on full
power for 1.5
minutes

Stir

Heat for a
further minute

Enjoy delicious
beans



Tiziana's Beans

Empty contents
into
microwaveable
container and
cover

Heat on full
power for 1.5
minutes

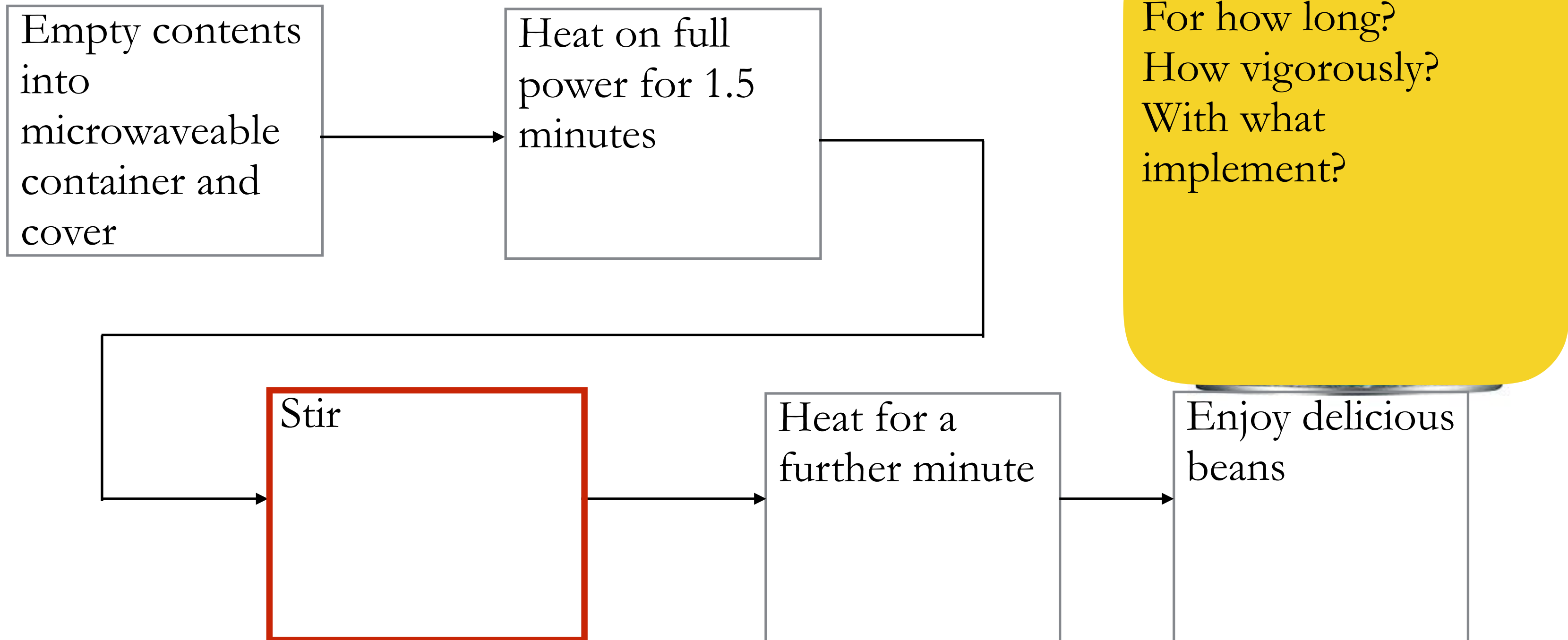
Microwaves vary in
power from 500 to
1200 watts

Stir

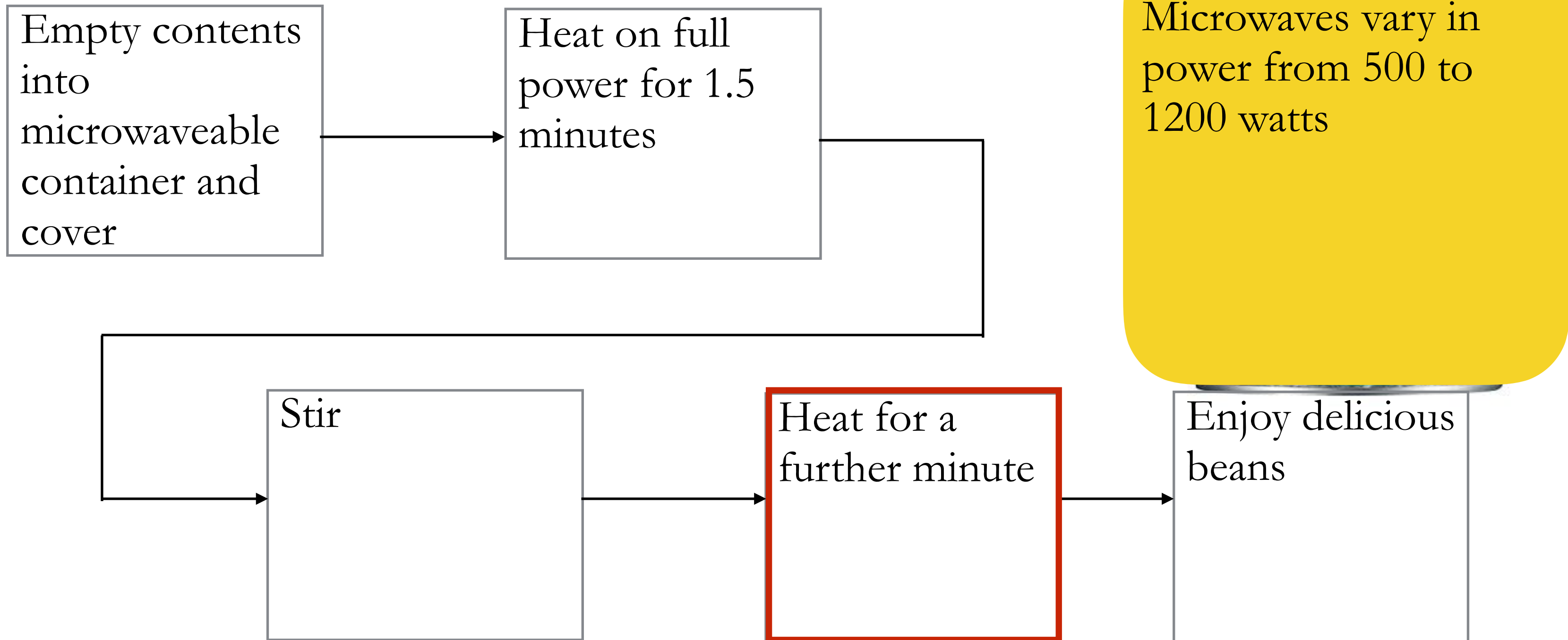
Heat for a
further minute

Enjoy delicious
beans

Tiziana's Beans



Tiziana's Beans



Tiziana's Beans

Empty contents
into
microwaveable
container and
cover

Heat on full
power for 1.5
minutes

Stir

Heat for a
further minute

Enjoy delicious
beans



Model Driven Development

- Models as drafts
- Models as guidelines (documenting design decisions)
- Models as **programs**
 - Requires some piece of software to translate from model to program
 - Simplifies description

Model Driven Development

Foundations of CS:

No translation software exists

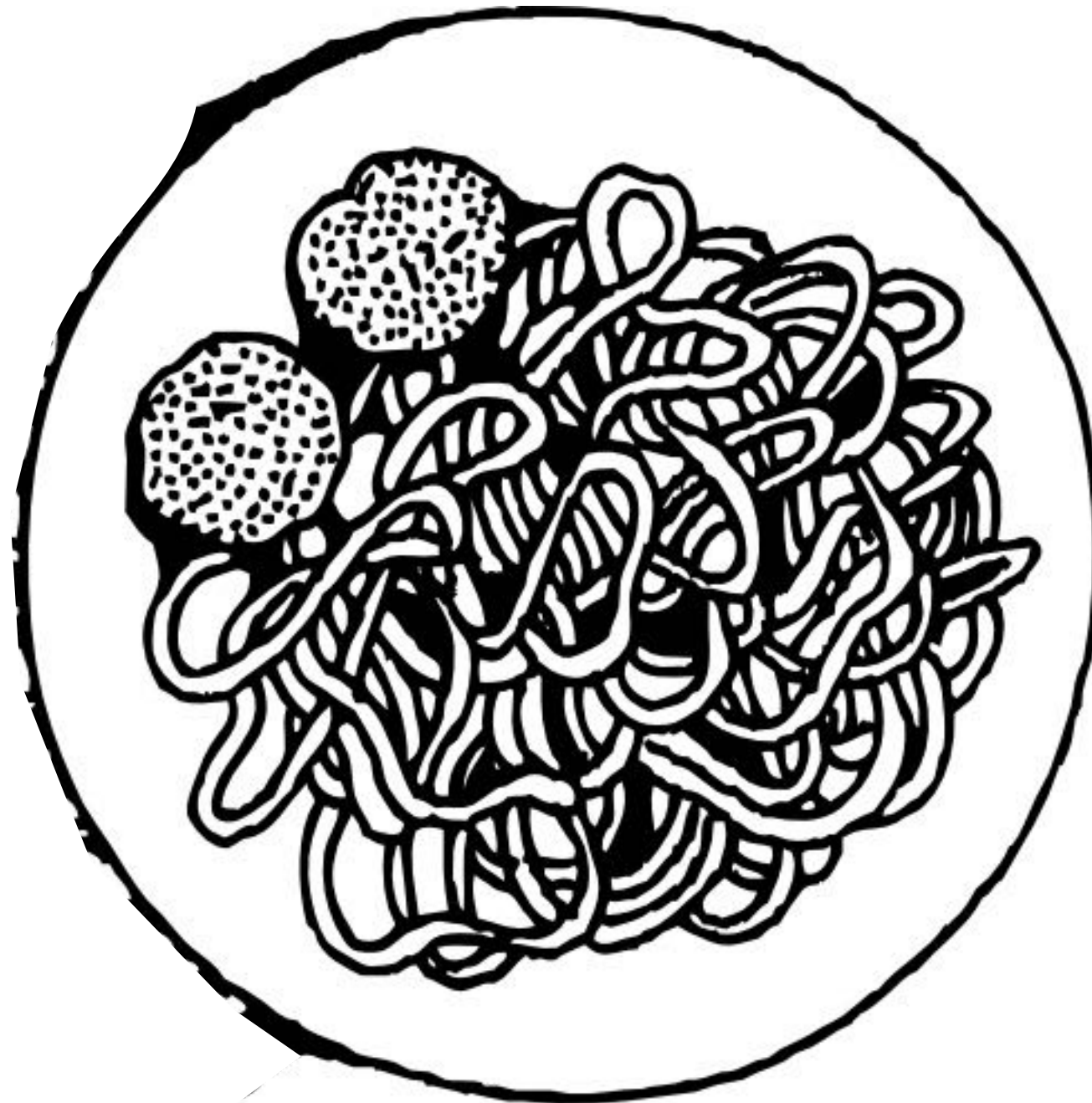
Descriptions are very precise

- Models as drafts
- Models as guidelines
- Models as **programs**
 - Requires some piece of software to translate from model to program
 - Simplifies description

Following instructions

- Blank piece of paper
- Draw a circle
- Draw two smaller circles inside it
- Draw a wavy line from the top of the first small circle to the edge of the large circle
- Repeat 10 times
- Draw a wavy line from the top of second small circle to the edge of the large circle
- Repeat 10 times
- Add 10-20 dots into each small circle

Target Image



Assessment

- Labs 5%
- In-class quizzes 15%
- Mid Term (November 13th) 30%
- Final exam 50%
- Extra credit assignments each week

Labs

- Exercise sheets distributed the week before the lab
 - Some paper based questions - do these **before** the lab
 - Some coding questions
- Marks given for participation (50% - 100%)
 - Students take turns working through problems
 - Full credit given for **genuine** participation
- Marks given for lab questions (0% - 50%)
 - Full credit for emailing answers
- Labs start **next week**, no Monday lab

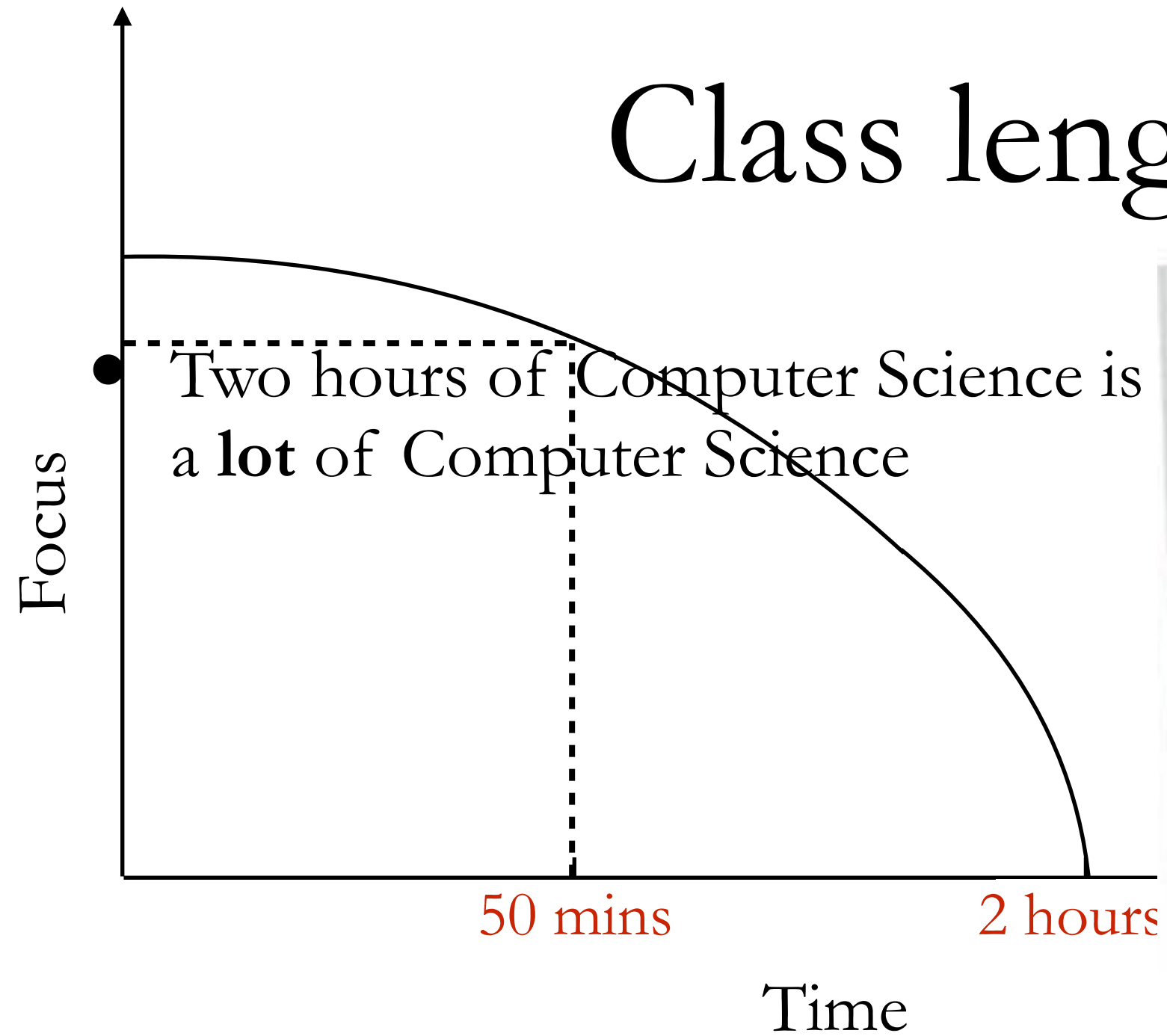
Class length

- Two hours of Computer Science is a **lot** of Computer Science

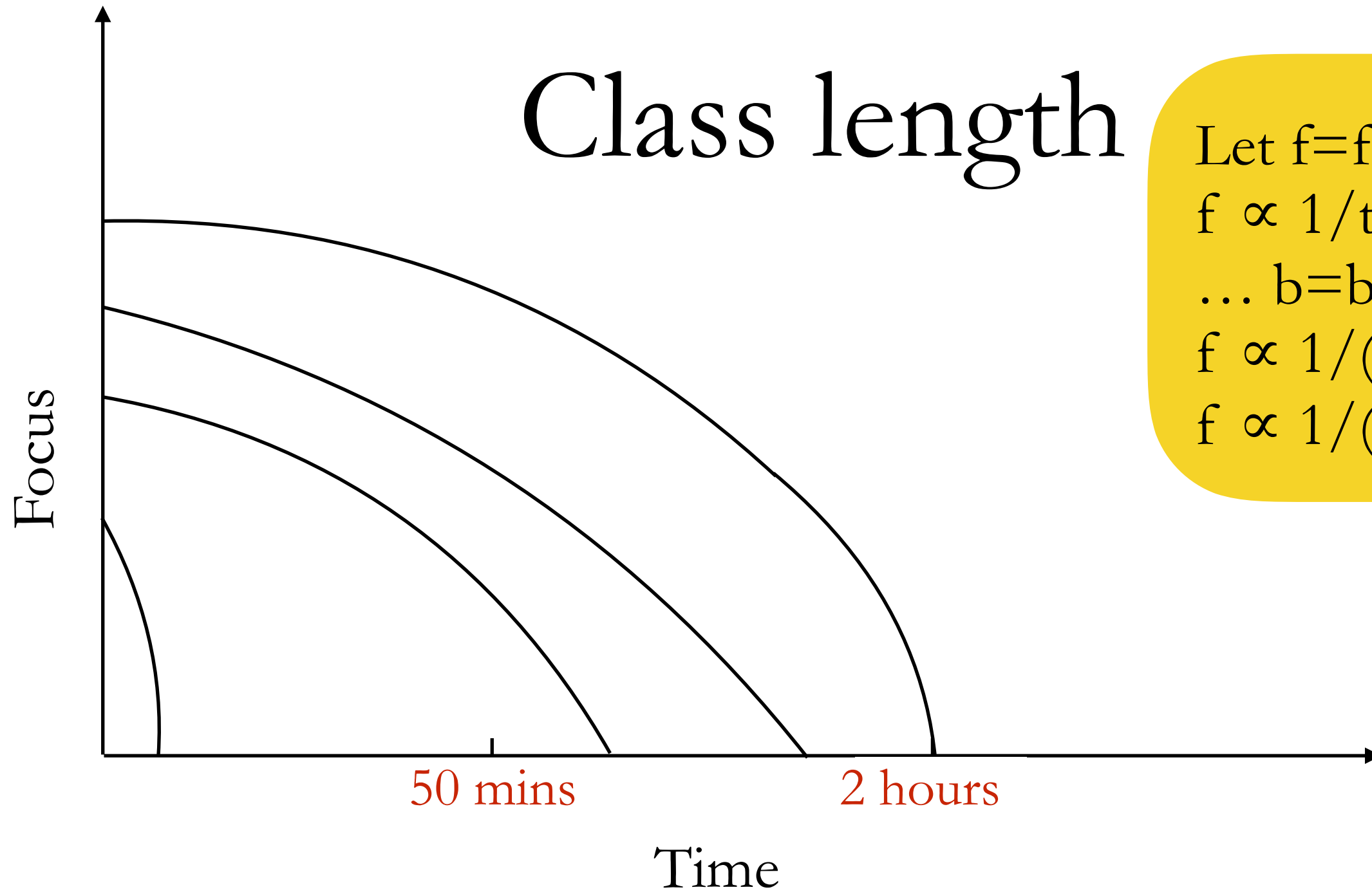


Class length

Let f =focus, t =time



Class length



Let f =focus, t =time

$$f \propto 1/t$$

... b =boringness, h =hangover, etc.

$$f \propto 1/(t + b + h)$$

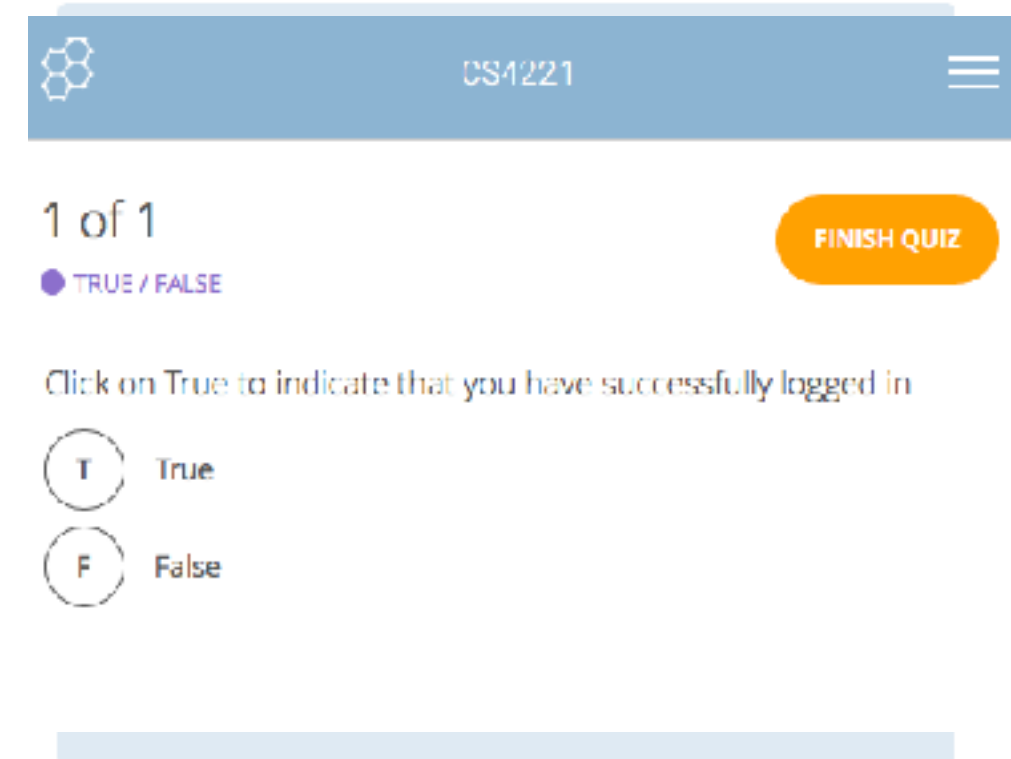
$$f \propto 1/((t + b) * h)$$

Class length

- 40 minutes of lecture
- 10 minute in-class quiz
- 10 minute break
- Lecture restarts **on the hour**

In-class quizzes

- <https://socrative.com/>
- Use through web or iOS/Android app
- Room Name: **CS4221**
- Student ID: **Your UL ID number**
- Click on **True**, then **Finish Quiz**
- We will use this in Monday's lecture!
- If you cannot use this, mail conor.Ryan@ul.ie



Extra Credit Assignments

- Assignments related to CS4221, but do not cover examinable material
- E-Mail solutions to Conor.Ryan@ul.ie with [CS4221] in the subject line
 - **Subject:** [CS4221] Extra Credit Week 7 Monday
- First **X** correct answers get extra credit
- Do individually or in groups of up to three
 - For group submissions, **everyone** in group gets the extra credit
- Topics: logic, cryptography... anything related to CS
 - Attempting to solve these problems is a worthwhile exercise!

Slide handouts

- Book of notes available from UL Print Room
 - E1-005
 - €2
- To take lecture notes
 - Use combination of your own notes and handouts
 - Diagrams and examples must be hand written

How to succeed at CS4221

- Purchase slide handouts **before** next lecture and have them with you
- Take notes!
 - Do not rely solely on handouts
 - These are designed to be filled in
- Keep up with material
 - In-class quizzes will reward this
- Attend labs and do prep work
- Ask questions!
 - In lectures, after lectures, labs, office hour, e-mail...

Class Schedule

Week	Lecture 1	Lecture 2	Labs
7	Introduction	None (Open Days)	None
8	Short + Dry Run	Normal + Quiz	Yes
9	None (Bank Holiday)	Normal + Quiz	Yes
10	Normal + Quiz	Normal + Quiz	Yes
11	Mid Term	Normal + Quiz	Yes
12	Normal + Quiz	Conclusion	Yes

Extra Credit Assignment #1

- Email solution to Conor.Ryan@ul.ie with [CS4221] in subject line
- If this is a group, include a group name and the names and ID numbers of each member
- Extra credit (1%) given for **current best submission** at the end of each day
 - Monday
 - Tuesday
 - Wednesday
- Best overall submission by Monday (23rd Oct) 10AM gets 2% extra credit
- You can enter once per day

Assignment

- Give two search terms that return the **fewest** (but greater than zero) hits on Google along with the number of hits you got
- Rules
 - The score you get credited with is the number of hits when we reproduce the search
 - No proper nouns (person, place, organisation, etc.); English words only
 - No quotation marks
 - At least the first few hits should be PG rated!
 - Ask yourself: *What would Grandma think?*
- A leader board will be published each day with the word combinations

Reminder:

Mail: Conor.Ryan@ul.ie

Subject: [CS4221] Extra Credit Week 7 Monday

ent

vest (but greater than zero) hits
on Google along with the number of hits you got

- Rules

- The score you get on the lecture
reproduce the search
- No proper nouns (p
- No quotation marks
- At least the first few hits should be PG rated!
- Ask yourself: *What would Grandma think?*
- A leader board will be published each day with the word combinations

Have Socrative installed in time for Monday's
lecture

Log in to verify your account **before** Monday

Purchase handouts from Print Room (E1 005)

<http://193.1.101.7/4221>

Reminders

- No Thursday lecture due to Open Days
- Download and log in to Socrative
 - Mail Conor.Ryan@ul.ie if you can't access it
 - OR if you will be unable to use phone/tablet/laptop during lectures
- Class website: 193.1.101.7/4221
- Always put [CS4221] in the subject line of mails
- Labs start next week, no Monday labs in Week 8 or Week 9.