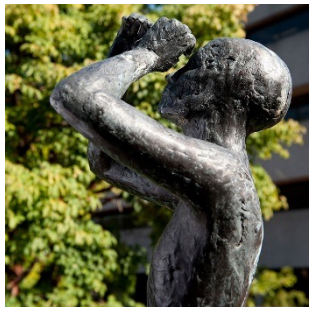


Lesson 1 – What is a computer program?

MaREI Python Course – September 2022

Cathal Hoare

A TRADITION OF INDEPENDENT THINKING

UCC

University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Lecture Contents

Welcome

What is a program?

Writing an Algorithm

Tools of the Trade

Welcome!

- Welcome to Computer Science and Western Gateway Building
- Outside of the lab, I can be found in G.67 (corner of building by river and on western end).
- I can be reached on 087 2413643
- In case of a building emergency…
- Labs aren't secure…don't leave valuables alone.
- Other essentials

What do you hope to achieve?

- Tell me about you:
  - How much programming have you done?
  - What would you like to take away from the course?

About Cathal

LEMON TIRAMISÙ WITH LIMONCELLO *TIRAMISÙ AL LIMONE E LIMONCELLO*

Liguria is famous for its lemons, and I made this lovely light version of tiramisù for my friends Lise and Bartolo, who own a vineyard in the hills near the Cinque Terre town of Vernazza. I used lemons harvested from their back garden and their homemade limoncello, which was superb. This dessert really tastes of Italy, and it's great for entertaining as you can make it up to 12 hours ahead.

1 Put the egg whites in a large bowl and add half the sugar. Whisk with an electric whisk until they form stiff peaks.

2 Place the egg yolks in a large bowl and add the remaining sugar. Whisk for about 3 minutes or until thick and pale. Add the mascarpone and whisk to combine. Stir in the lemon zest. Using a flexible spatula or metal spoon, gently fold the egg whites into the mascarpone mixture. Set aside.

3 Pour 100ml cold water into a non-metallic dish and stir in the lemon juice and limoncello. Set aside.

4 Take 6 dessert glasses, about 8cm diameter and 8cm high. Spoon 2 tablespoons of the mascarpone mixture into each glass and spread to cover the bottom.

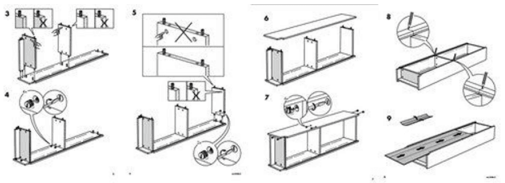
5 Dip a biscuit in the lemon water for no more than 2 seconds, cut the biscuit in half across and lay both halves, sugared-side up, on top of the mascarpone. Repeat for the remaining glasses.

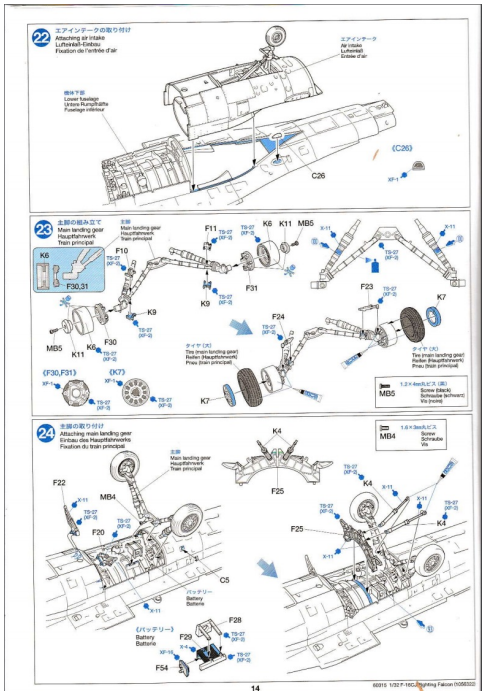
6 Spread 2 further tablespoons of the mascarpone mixture over the biscuits, then cover with another layer of the remaining biscuits dipped in the lemon water and halved as previously. Top with a final layer of the mascarpone mixture. Cover with cling film and chill for about 5 hours or until set.

7 To serve, remove the cling film and grate over a little lemon zest.

Serves 6

4 medium eggs, separated
100g caster sugar
500g mascarpone cheese, drained
Zest and juice of 2 unwaxed lemons, plus extra lemon zest to decorate
4 tablespoons limoncello (lemon liqueur)
12 Savoiardi biscuits (sponge fingers)





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Thinking about programming

- A program is a series of ordered instructions
  - The instructions are written using an unambiguous language – in our case Python
  - The instructions must be in the correct order

- We need two things:
  - A plan – how do we plan to tackle the problem. This can be a sketch, a set of bullet points or a more formal design methodology. This is the computational algorithm.
  - A list of those instructions converted to our programming language – aka a program
  - We should ALWAYS keep these as two separate tasks

- We should also accept that:
  - We will make lots of mistakes. We need to test, test and test some more. We should not just make sure that our code runs, but also check that it produces the correct results.

Thinking about programming

- In the end we should aim to:
  - Write code that works correctly – gives a correct answer for all circumstances encountered by the program
  - Is written reasonably efficiently - it doesn't have to be perfect, but it should be easy to understand what we are doing so that we can fix bugs later, should arrive at the correct answer with a minimum amount of code (less effort for us, easier to maintain and easier for the computer to run)
  - Shouldn't break anything else – our code may run as part of a system – always consider the affect our code has on the system.

Why should I know about programming?

- Much of our life is influenced by software – its nice to understand the process of how it works
- Programming is a useful skill – it allows us to do interesting and useful things
- In non-software careers, its empowering to understand the process. Invariably, you will encounter systems and need to discuss some technical issues
- It can be great fun and very satisfying

To be a good programmer

- Practice problem solving – more than anything else!
- Learn a language
- Understand the work that others have done, and how you might be able to use it
- Know the tools that are available to you

Solving a problem…

1. Pick a prominent key
2. Check if the key fits
3. if the key fits see if it turns
    1. if the key turns, you've found the key
    2. otherwise try the next key by repeating

Tools

- Here we looked at a set of tools:
  - Microsoft Visual Studio Code
  - Github
  - Anaconda and virtual enviornments
  - Websites like Pypi and pip


Next : Writing some code!