Week 8 - Complexity Analysis

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CSCA48 - TUT002

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Content Covered so Far

- C programming
- Memory model
- Arrays and strings
- Pointers
- CDTs & ADTs
- Linked lists
- Testing
- Binary Trees & BSTs
- Big O & Complexity Analysis

Problem

We have **robotic drawing arm** overtop a large paper canvas. The drawing arm has the following commands available to it:

1. Pen Up
2. Pen Down
3. Move Upward (# of mm)
4. Move Downward (# of mm)
5. Move Left (# of mm)
6. Move Right (# of mm)
7. Change Colour (# of colour pen to use next)

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The **tail**!

New Problem

Suddenly we notice an issue, people are providing *very complex* drawings and the robot is taking unreasonably long to complete the work.

The work in question here is the following two steps which need to be performed by the program:

1. Read all the commands from a text file and add them to the linked list *at the tail*.
2. Traverse the linked list executing each command.

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Since this is a simple list traversal the complexity is $O(n)$.

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Now let's try **step #1**: reading all of the commands from a text file and adding them to the linked list **at the tail**.

Reminders

- Each student to submit their own `.pdf` file or photo which can be the same as that submitted by members of their group.
- Ensure your file is named **exactly** as instructed on Quercus.
- You are **not** supposed to keep working on this, you will not be marked on correctness so as long as you submit work that shows you were engaged during this tutorial you will get full marks.