NPA Data Science: Programming Lab 1 - Representing algorithms

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Part 1: Algorithms - Accessing Draw.io

1.1 In the learners notes we learned about representing algorithms in two ways, via flowcharts and decomposition in this lab you will put this into practice by writing out algorithms, if you are unsure of how to solve the problem, write the main problem first, then use a top down stepwise approach to solving it, by breaking it down into sub tasks, then breaking those into sub-sub tasks if necessary.

1.2 There are many programs available to create flow charts but we would recommend using the free draw.io which works in any web browser. Go to this page (draw.io) and click:

Create a new diagram, give it a sensible name, choose ‘Blank Diagram’ and click ‘Create’.

Once your flow chart is complete, download the flowchart, click ‘File’ menu and ‘export as’. Choose to export as PNG.

Choose to download to your Device, click ‘Download’.

Part 2: Create and Represent Algorithms

Create the following algorithmic representations and add these to the ePortfolio for this week:

2.1 Create an algorithm to determine if a number is an even number:

1) Write out the steps of your algorithm in decomposition notation.

2) Draw your algorithm as a flowchart using Draw.io.

2.2 The next algorithm to create is one to check if a word contains a vowel ‘aeiou’:

1) 2Write out your algorithm in decomposition notation.
2) Draw your algorithm as a flowchart.

2.3 This algorithm should be an enhancement of the previous, in 2.2 you created an algorithm to determine if a word contained a vowel, can you improve this and say how many vowels - if any - a word contains?

1) Write an algorithm that is an improvement of the algorithm in 2.2 in decomposition notation; this should now calculate the number of vowels in a word.
2) Write a flowchart to represent your algorithm.

2.4 The next algorithm we want to create is an algorithm to check if a number can be divided by 3 without a remainder. The algorithm should then check if the number can be divided evenly by 4. Then the algorithm should check if the number can be divided evenly by both 3 and 4.

1) Write out your algorithm in decomposition notation.
2) Draw your algorithm as a flowchart.