Worksheet Two Extra Exercises

"Don't Panic"
Douglas Adams, The Hitch Hikers Guide to the Galaxy 1979

Unit Learning Outcomes Addressed by this worksheet: 1 & 2

Prior to coming to this practical you must have:
- Read through and summarised modules one and two from the lecture notes.
- Read through the how to print from Unix handout in the St151 unit web area.
- Double checked via the unit web area that you are attending the correct practical.

All of the Java code for this worksheet should be placed in the P02 directory that you created lasted week.

Exercise Eight (Another algorithm with sub modules)
Electric powered radio controlled model aircraft these days make use of Lithium Polymer (Lipo) batteries for their power source. While light and powerful compared to other types of batteries they are also renowned for exploding if not properly used. One sure way to get a Lipo battery to ignite is to attempt to draw current from it at a rate that exceeds its capacity. The maximum rate that a Lipo battery can supply power is called a C-Rating. A C-rating is calculated using the formula below:

$$\text{CRating} = \frac{\text{amps} \times 1000}{\text{mAh}}$$

Where amps is the maximum draw on the battery and mAh is the battery size.

Another sure way to set fire to a Lipo is to drain it completely. In actual fact the voltage levels in each Lipo battery cell should never be allowed to fall below 3.2 volts.

The flight time of a model aircraft (powered at full throttle for the entire flight) is calculated using the formula below:

$$\text{Time} = \frac{60}{\text{CRating}}$$

Where time is the flight time in minutes.

Given that the model will not be run at full throttle all the time, this time limit will include a reasonable safety factor. Lipo batteries are described by the number of cells, the mAh capacity and the C-Rating. Hence knowing the flight time and purchasing a battery with a high enough C-Rating will ensure no exploding model planes.

Design, in pseudo code, an algorithm which will input amps and mAh from the user and output the CRating and flight time to the user. Think carefully about the best way to employ sub modules in your algorithm. Your main algorithm should consist of only sub modules calls and, other than the main sub module, you should have at least three other sub modules. Note you may assume that the user input is always valid.

You can test your algorithm on the following inputs:

Amps	mAh
15	1800
8	800
27	2250
35	4000

Exercise Nine(Another Java implementation)
Convert your pseudo code design into a complete Java application.