Exercises for Day 12

Exercise 1. Starting from $n = 1$, use a `while` loop to keep printing n and doubling n, but stop when $n > 100$. Keep track of the number of times the loop runs as well as the value of n. Print a table (to a text file) showing the results. Your table should look like the one below:

Counter	n
1	1
2	2
3	4
4	8
5	16
6	32
7	64

Exercise 2. Print (to a text file) a table of the squares of integers, but only while the squares are less than 500. Format the table nicely.

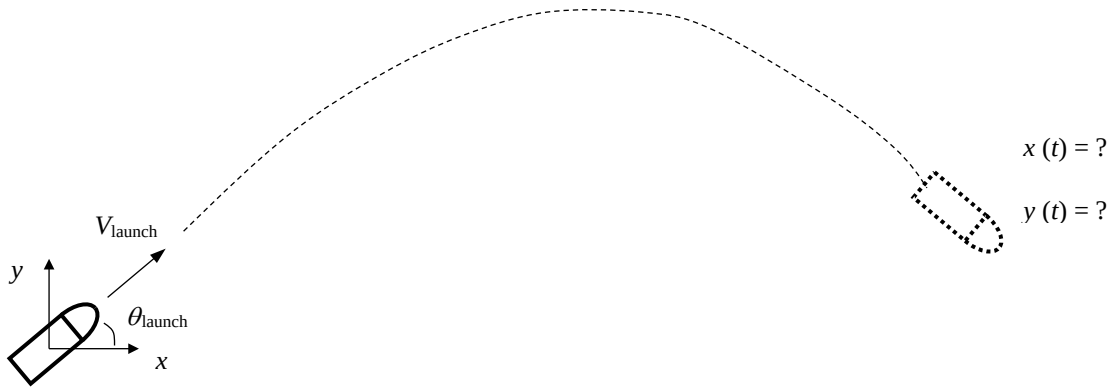
Exercise 3. Print (to a text file) a table of integers, their squares, and the sum of the squares. Use a `while` loop so that the table ends just after the sum of the squares becomes larger than 700. The first few rows of the table will look like the following:

Integer	Square	Sum of Squares
1	1	1
2	4	5
3	9	14

(**Hint:** The last entry for Sum of Squares will be 819.)

(over)

Exercise 4. Recall the rocket problem from Day 2 Exercise 4:



For a launch speed V_{launch} and a launch angle θ_{launch}, the relevant governing equations are

Initial horizontal velocity: $u_0 = V_{\text{launch}} \cos(\theta_{\text{launch}})$

Initial vertical velocity: $v_0 = V_{\text{launch}} \sin(\theta_{\text{launch}})$

Instantaneous horizontal displacement: $x(t) = u_0\, t$

Instantaneous vertical displacement: $y(t) = v_0\, t - \frac{1}{2} g\, t^2$

Plot the trajectory of a rocket with a launch speed of 80 m/s and a launch angle of 50°:

a) Use a `while` loop to create a vector of values for x and y, with t going from zero until the rocket hits the ground. (This means that the `while` loop runs while y is greater than or equal to zero.) Use a time increment of 0.1 s.
b) Plot the trajectory: `plot(x,y)`.
c) Turn in the plot along with your script.