# Synthesis

1. You just won a million dollars! You decide to invest $500,000 in a term deposit for a period of 5 years. The annual interest rate is 10%, and the interest is added to the principal sum each year (compound interest). How much will your savings be worth in 5 years?
   1. Make the algorithm with specified number (internal data).
   2. Generalize for any amount, any duration, and any interest rate.

1. Write an algorithm that displays the first 100 numbers of the Fibonacci sequence. This sequence begins with the numbers 1, 1, 2, 3, 5, 8, …, where each new number in the sequence can be found by adding the two previous numbers in the sequence.

1. Write a program that displays all the prime numbers from 1 to 50,000.

1. (\*) Write a program that reads the grades for the exams and assignments in a course including 2 exams and 2 assignments. The program should be able to adapt to the conditions of the course. More precisely:

* The program should read the number of students in the course.
* For each of the four grades, ask the user what the weight of the grade is.  
  In other words, how much is the grade worth as a percentage of the final grade for the course?
* The program should validate that the total of the four weights given is indeed equal to 100.
* Then, for each student, the program should read the student’s four grades (each out of 100). Verify that the values entered are between 0 and 100. Then calculate the final course grade for each student.
* The program should display whether the student passes or fails the course. A student passes if they achieve 60 or greater.
* Finally, the program should display the average of all the students’ final course grades.