

# Exam PJGG

## 26/08/2020



The questions can be answered in English and/or Italian.

1. Discuss *abstract classes* and *interfaces* in Java. What is their purpose? What is the difference? How do they frame in the concept of inheritance?
2. What is type casting? Explain the difference between explicit and implicit type casting. Illustrate with examples in Java.
3. Illustrate how you can run over an ArrayList using a standard loop, a foreach loop, and a list iterator. Give an example in Java for the three situations. Pay attention to correct Java syntax!
4. Make a Java method that displays the total time on the console, converted from seconds to hours/minutes/seconds, for a given integer value  $t$  representing the amount of seconds. Some examples:

Input: $t = 9020$	Output: 2 hours, 30 minutes, 20 seconds
Input: $t = 6020$	Output: 1 hour, 40 minutes, 20 seconds
Input: $t = 3020$	Output: 50 minutes, 20 seconds

Pay attention to correct Java syntax and the output format!

5. Make a Java method that returns the number of ways a person can climb stairs consisting of  $n$  steps, for a given integer value  $n$ , where the person may only climb 1 or 2 steps at a time. An example: for  $n = 4$  there are 5 ways to climb, namely

[1, 1, 1, 1] or [2, 1, 1] or [1, 2, 1] or [1, 1, 2] or [2, 2]

Hint: using recursion can be useful. Pay attention to correct Java syntax!

6. Make a class *Calendar* to create a calendar full of activities.
  - Create a new calendar, possibly with an initial list of activities. An activity is characterized by a title, short description, date (day/month/year), start time, and end time.
  - Add activities to the calendar. It should be also possible to cancel activities.
  - Allow for certain data processing on the list of activities: ask for activities on a certain day, ask for activities within a certain month, etc.
  - Make a main method with a small test for the class.

Provide the complete Java code of your class (and possibly other supporting classes). Pay attention to correct Java syntax and class design!