

Functional Programming: Doodle

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Programming Project: Assignment #1 (2015 - 2016)

1 Introduction

The final mark for the Functional Programming course is based 50% on a programming project (25% on the first programming assignment, 25% on a second programming assignment) and 50% on the oral exam. This document describes the first programming assignment. The second assignment will be handed out later in the semester.

Submission is done by sending your raw code files to the teaching assistant: Laurent Christophe (lachrist@vub.ac.be). The assignment is due the 7th of December (8AM). You will have to defend both parts of your project individually during the exam session on a date that will be communicated later. Notice that the execution of the project is strictly individual and no plagiarism shall be tolerated!

The project will be marked according to how well you fulfil the functional requirements and according to how well you apply the concepts explained during the lectures and the lab sessions. If you encounter any problem or if you have a precise question, feel free to contact the assistant at lachrist@vub.ac.be.

2 Requirements

The goal of this first programming assignment is to create a terminal-based application for scheduling meetings. This meeting application is inspired from doodle¹: Suppose that Jessy wants to organize a Christmas party. As there are many people involved, he decides to use a doodle application. Hence, Jessy creates a doodle, provides all the possible time slots for the event and receives an identifier. He can now communicate this identifier to Walter and Gustavo so that they can indicate their availabilities. After everyone completed the doodle, Jessy can hopefully select a time slot that satisfies everybody. N.B: a possible execution is available at the end of this document.

Your code should implement the following functionalities:

1. Create a new doodle with a title and obtain an identifier allowing later access to the Doodle.
2. Display a doodle as an ASCII-based table containing its title and time slots.
3. Add a time slot with a start time and an end time.
4. Time slots should be precise to the minute and work everywhere on earth.
5. Time slots should be displayed by order of starting time.
6. Make sure that a doodle does not contain overlapping time slots.
7. Remove time slots by position.
8. Access to a doodle with an identifier.
9. Add/Remove a name on a time slot by position.

¹<http://doodle.com/>

3 Facilities

For this programming assignment, you are allowed to use a Haskell file² that contains code for helping you to interact with the user as well as templates that will force you in the direction of a well-designed solution. A.o., the file exposes the `Doodle` and the `Pool` type class which you need to implement:

```
class Doodle d where
  initialize :: String -> d t           -- create an empty doodle from a title
  add :: (t,t) -> d t -> d t           -- add a time slot to the doodle
  remove :: Int -> d t -> d t          -- remove a time slot to the doodle
  toogle :: String -> Int -> d t -> d t -- toogle a name to a time slot

class Pool p where
  freshKey :: (Ord k, Enum k) => p k (d t) -> k      -- return an unused key in the pool
  set :: Ord k => k -> (d t) -> p k (d t) -> p k (d t) -- associate a doodle to a key
  get :: Ord k => k -> p k (d t) -> Maybe (d t)       -- lookup for the associated doodle
```

To help you creating the `main` function of your application, the file exports a function called `run`. It should be called with an initial empty pool of doodle, for instance: `main = run emptyDoodle`.

²Available on the Poincarre platform in the “Assignment” subdirectory

Possible Execution

```
Create a new doodle or participate to an existing one?
> Left "Christmas party!"
Add/Remove a slot?
> Just (Left ("2015-12-25T12:00+01:00", "2015-12-25T17:00+01:00"))
+-----+
| Christmas party! |
+-----+
| 2015-12-25T12:00+01:00 | 2015-12-25T17:00+01:00 |
+-----+
Add/Remove a slot?
> Just (Left ("2015-12-24T18:00+01:00", "2015-12-25T00:00+01:00"))
+-----+
| Christmas party! |
+-----+
| 2015-12-24T18:00+01:00 | 2015-12-25T23:00+01:00 |
+-----+
| 2015-12-25T12:00+01:00 | 2015-12-25T17:00+01:00 |
+-----+
Add/Remove a slot?
> Nothing
Doodle ID: 1
Create a new doodle or participate to an existing one?
> Right 1
Identify yourself
> "Alice"
+-----+
| Christmas party! |
+-----+
| 2015-12-24T18:00+01:00 | 2015-12-25T23:00+01:00 |
+-----+
| 2015-12-25T12:00+01:00 | 2015-12-25T17:00+01:00 |
+-----+
Toogle?
> Just 0
+-----+
| Christmas party! |
+-----+
| 2015-12-24T18:00+01:00 | 2015-12-25T23:00+01:00 | Alice |
+-----+
| 2015-12-25T12:00+01:00 | 2015-12-25T17:00+01:00 | |
+-----+
Toogle?
> Nothing
Thanks for participating!
Create a new doodle or participate to an existing one?
^C
```