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2016 at 23:30 UTC

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Case study: A small typed database

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- More advanced data structures
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TIME ON PLANET SHADOKUS (30/30 points)

On planet Shadokus, a year has 5 months, each month has 4 days, each day has 3 hours and each hour has 2 minutes. A calendar date is therefore defined as the record type date of the given prelude.

1. A date is well-formed if its year index is >= 1, its month index is >= 1 and <= 5, its day index is >= 1 and <= 4, its hour index is >= 0 and <= 2, and its minute index is >= 0 and <= 1.

The start of year 12 would be:

```
{ year = 12; month = 1; day = 1; hour = 0; minute = 0 }
```

The end of year 12 would be:

```
{ year = 12; month = 5; day = 4; hour = 2; minute = 1 }
```

Write a function wellformed : date -> bool which checks that the input date is well formed.

- 2. On planet Shadokus, the origin of time is the discovery of the Big-Lambda-Machine, a magical computer that evaluates the infinite lambda-term of time. It is defined by value the origin of time of the given prelude.
 - Write a function next: date -> date which computes the date which comes one minute after the input date.
- 3. In this computer, the time is represented by an integer that counts the number of minutes since $1/1/1 \ 0:0$ (the origin of time).
 - Write a function of int: int -> date that converts such an integer into a date.

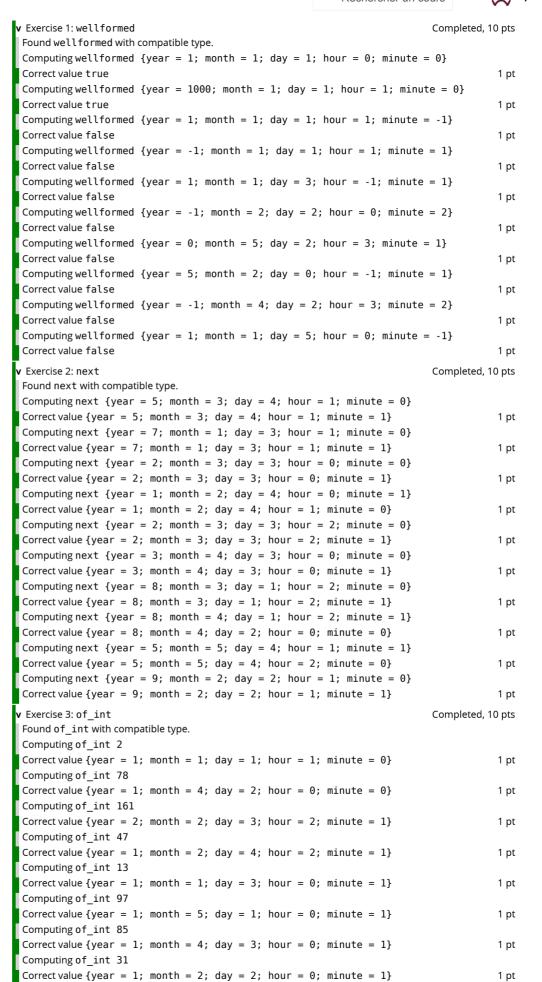
THE GIVEN PRELUDE

```
type date =
  { year : int; month : int; day : int;
  hour : int; minute : int }

let the_origin_of_time =
  { year = 1; month = 1; day = 1;
  hour = 0; minute = 0 }
```

YOUR OCAML ENVIRONMENT

```
let wellformed date
                     et wellformed date =
if date.year >= 1 &&
date.worth >= 1 && date.month <= 5 &&
date.day >= 1 && date.day <= 4 &&
date.hour >= 0 && date.hour <= 2 &&
date.minute >= 0 && date.minute <= 1
then true else false;;
                                                                                                                                                                                                                                                                                                                                                                       Evaluate >
                                                                                                                                                                                                                                                                                                                                                                          Switch >>
               let next date =
                    et next date =
let rest_min = (date.minute + 1) / 2 in
let rest_hour = (date.hour + rest_min) / 3 in
let rest_day = (date.day + rest_hour) / 5 in
let rest_month = (date.month + rest_day) / 6 in
{ year = (date.year + rest_month);
    month = (date.month + rest_day - 1) mod 5 + 1;
    day = (date.day + rest_hour - 1) mod 4 + 1;
    hour = (date.hour + rest_min) mod 3;
    minute = (date.minute + 1) mod 2
};
10
11
12
                                                                                                                                                                                                                                                                                                                                                                          Typecheck
13
14
15
16
17
                                                                                                                                                                                                                                                                                                                                                                  Reset Templ
18
19
20
21
              let rec of_int minutes =
  if minutes = 0 then the_origin_of_time else
  next (of_int (minutes - 1))
22
23
                                                                                                                                                                                                                                                                                                                                                                   Full-screen |
              ::
25
26
                                                                                                                                                                                                                                                                                                                                                                    Check & Sa
```









Correct value {year = 1; month = 5; day = 4; hour = 1; minute = θ }

nt

A propos

Aide

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Conditions générales d'utilisation

Charte utilisateurs

Politique de confidentialité

Mentions légales







