

Programming Paradigms Exercise 3 - Prolog 2

Theodoros Chondrogiannis

2nd Semester 2016/17

1. Write a predicate `firstPrimeBetween(A,B,P)` which is true *iff* P is the smallest prime number between A and B. For example, the following query:

```
?- firstPrimeBetween(12,24,X).
```

```
X = 13.
```

```
?-
```

returns `X = 13` and stops.

2. There is a tariff system for public transport where prices are based on traveled kilometers (using buses, trains and cable cars). The price for each kilometer depends on how many kilometers were traveled before, as shown in the following table:

previously traveled kilometers	price
0 up to 1000	0,08 EUR/km
1001 up to 10000	0,04 EUR/km
10001 up to 20000	0,02 EUR/km
more than 20000	0,00 EUR/km

Write a Prolog program which computes the cost to travel `X` kms.

3. Lists: Finding minimum and sorting.
 - (a) Implement a program in Prolog to find the minimal element in a list of numbers. List all the steps of the execution given the list `[5,2,9]`.
 - (b) Implement *selection sort* in Prolog (hint: no swap needed).
4. Write a predicate `dom(X,Y)` which is true iff a list `X` is not equal to `Y` and all components of `X` are less or equal than in `Y`. No components are therefore higher and at least one component is lower. For example, `dom([1,3,5],[1,4,8])` is `true`, but `dom([1,3,5],[1,3,5])` and `dom([4,3,5],[1,4,8])` are `false`.