Searches in JPF

EECS 4315

www.cse.yorku.ca/course/4315/

Search strategies

JPF contains different search strategies:

- depth first search (`gov.nasa.jpf.search.DFSearch`),
- breadth first search (`gov.nasa.jpf.search.heuristic.BFSHeuristic`)
- and several other search strategies.

JPF has been designed in such a way that it can easily be extended. For example, a new search strategy can be added to JPF.

The Search Class

The class `Search` of the package `gov.nasa.jpf.search` contains numerous attributes and methods that are useful for implementing search strategies.

By extending the `Search` class, we inherit all these features.

Depth First Search

```
import gov.nasa.jpf.search.Search;

public class DFSearch extends Search {
   ...
}
```

Constructor of DFSearch

```
public Search(Config config, JVM vm)
```

- The `Config` object contains the JPF properties.
- The `JVM` object refers to JPF's virtual machine.

Problem

Implement the constructor of the `DFSearch`.

The search Method

The method

```
public void search()
```

drives the search.

```
public boolean forward()
```

tries to move forward along an unexplored transition and returns whether the move is successful.

```
public boolean backtrack()
```

tries to backtrack and returns whether the backtrack is successful.

States

`public boolean isNewState()`

tests whether the current state has not been visited before.

`public boolean isEndState()`

tests whether the current state is a final state.

`public boolean isIgnoredState()`

tests whether the current state can be ignored.

Problem

Implement the `search` method of the `DFSearch` class.

The done Attribute

Other components of JPF can end a search by setting the attribute `done` of the class `Search` to true.

Problem

Modify the `search` method of the `DFSearch` class to incorporate the `done` attribute.

Request Backtrack

Other components of JPF can request a search to backtrack by means of the method

```
public boolean checkAndResetBacktrackRequest()
```

Problem

Modify the `search` method of the `DFSearch` class to incorporate the `checkAndResetBacktrackRequest` method.

Project

On Monday February 22, hand in a proposal for your project.

Tomorrow's Lecture

Speaker: Julia Rubin
Title: The Secret Life of Mobile Applications
Location: Lassonde Building, room 3033
Time: 14:00-15:00

Reading Week

Enjoy

and think about your project.