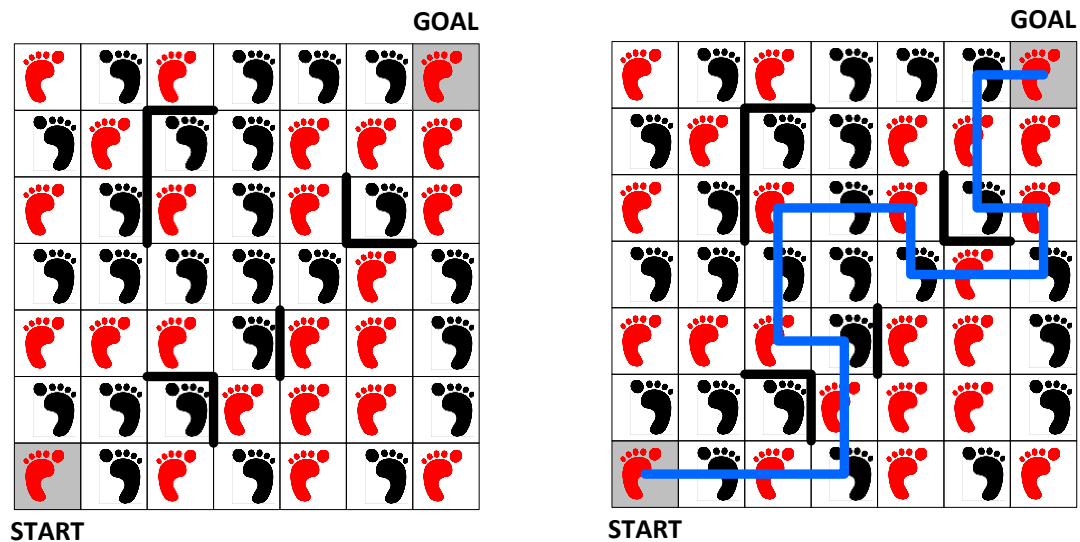


GAME “THE FOOTPRINT MAZE”

The following pictures represent a specific configuration of the game “THE FOOTPRINT MAZE”, and its solution.



The maze is made up of footprints that correspond to either the right or the left foot. The purpose of the game is to travel from the START foot to the GOAL foot moving horizontally or vertically one space at a time and **alternating between left and right feet every step**. In addition, there are walls in the maze that can not be passed through.

If there is more than one walking path from START to GOAL you are required to find the fastest one.

YOU ARE REQUIRED TO DO THE FOLLOWING:

1. Problem Formulation and Design

1. Identify this problem's environment properties and define an appropriate performance measure.
2. Give the precise problem formulation needed for the problem to be solved by a search method.
3. Reason whether it is possible to apply the Relaxed Problem Technique to define an admissible and consistent heuristic. If so, apply this technique and give the resulting heuristic. Otherwise, explain whether you can define any other admissible and consistent heuristic.
4. Explain which search method is best to solve this problem. In your explanation you should include a comparison of the method of your choice against others you discard.

5. Design an intelligent system that solves the problem by invoking the search method you have selected. Your UML class diagram should include the objects from the templates FORMULATION and SEARCH discussed during the practical sessions.

2. Implementation

1. Implement the intelligent system you designed. It's compulsory to use the FORMULATION and SEARCH templates discussed during the practical sessions. **Under no circumstance will changes of any kind be allowed on the given templates.** If a new class, not provided with the templates, is needed for a search method the class should be added to the rest of the project's classes, not to the templates.
2. The **result** provided by the system must include:
 - Total path cost of the problem's solution according to your definition of the path cost function. This should be displayed on the system's console.
 - Sequence of actions that solved the problem: This sequence should be written in a log file making use of the class *SolutionLog.java*.
3. The "initial percepts" or input is provided by means of an XML file **feetmaze-i.xml** (where "i" stands for 1, 2, 3, etc.) available from the AI course page in alud2.

3. Submission format

The system's implementation should conform to the following folder structuring:

A root folder named after the group code (e.g. AIKE-00). Be aware that If the folder is named differently or doesn't conform to the structure explained below, the project will NOT be graded. The root folder should include the following subfolders:

- **src**: containing the source code. There is no restriction concerning package and class naming. However, a class named **MainProgram** should be created that includes the method **main()**.
- **bin**: containing the object code. (This folder may be empty since its content is generated as a result of compilation).
- **lib**: containing the .jar files corresponding to the FORMULATION and SEARCH templates. These .jar files should therefore be **aike_formulation.jar** and **aike_search.jar** respectively.
- **data**: containing the **feetmaze-i.xml** files that describe different cases of the "The Shoe Maze" game.
- **log**: for the log files. This folder can be empty since the log files are generated as a result of executing the system.

- **doc**: containing the document that gives answer to every question included in the Formulation and Design sections of this project specification. The acceptable formats for this document are **PDF**, **DOC** or **DOCX**.

Given the aforementioned folder structure, a **ZIP** file must be generated. Beware that compressed files other than ZIP, for example .RAR, will **not be accepted** and disregard of this restriction will result in the project **not being evaluated**. The .zip file must be named after the group code (e.g.: **AIKE-00.zip**), may have a maximum size of 2MB and is to be submitted in alud2.