Athens University of Economics and Business
Department: Computer Science
Course : Artificial Intelligence
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Instructor: Ion Androutsopoulos

1st Project

Develop a program in Java or C++ for the following problem. User Interface is not needed (e.g. you will not receive a higher grade if you build a graphical interface).

Bridge and Torch Problem. In this problem a family must cross a river at night walking on a trunk that is connecting two shores. The trunk can hold up to two people each time. Also, the family has got only one light bulb and each time one (1) person needs to hold it while on the bridge. Each member of the family requires a different amount of time to cross the river while walking on the trunk. This amount of time is fixed (in any direction) for each of the family members. For example, each time the grandmother passes across, she requires the same amount of time, but the grandfather requires a different amount of time (fixed again). When two family members cross the river together, the amount of time they require of crossing is equal to the amount of time that the slowest of the two requires to cross. The amount of time for each member to cross the river is known. Your program must find the best solution, that is with which order (and in which pairs or individually in each crossing) the family members must move so that the whole family can cross in the minimum amount of time. Consider that the number of family members, let N, and the amount of time (e.g. in minutes) that each member requires to cross the river are given as arguments to your program. You can test your program with different values of N (and different crossing times per person) and indicate in your report how long it takes approximately for your algorithm to find a solution. More examples (and variations) of this game can be found at the following addresses. The picture was taken from the first source.

- https://www.youtube.com/watch?v=Ppx7-Y9_ub0
- Bridge Crossing – Math Game Time