



Advanced Analysis Algorithms Assignment

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1 Aim

This assignment is intended to give you some exposure to the experimental nature of Computer Science - specifically the concept of measuring the performance of an algorithm and relating these measurements to the theoretical analysis of the algorithm. This will be accomplished by performing an experiment and preparing a document discussing the design, implementation, and evaluation of the experiment.

2 Instructions

Most of the work in this assignment will be done in groups. Each group should consist of not more than 3 students, and the groups must be formed and reported to me via email by **Wednesday, 20th Sept 2017, 17:00 hrs.**

Your work on the assignment includes the following stages:

1. Read the material in the library (or internet) on **Backtracking Algorithm**, and make sure that you fully understand the algorithm along with its theoretical analysis.
2. Implement Backtracking Algorithm for solving the game of **Peg Solitaire**. The input to your algorithm will be a starting configuration, and the output would be a final configuration. The literature on the game and sample input/output configurations can be obtained from the internet.
The above algorithm becomes examinable. It will be assessed in the final examination.
3. Read handout notes on empirical analysis (available on Sakai) and, if you have never done a laboratory report before, make sure that you find out exactly what you are required to do by consulting literature in the library (or internet), which tells you how to write laboratory reports.
4. Meet with your group to design an experiment which can be used to test and verify the theoretical analysis of the algorithm and compare it with different input patterns.
5. Prepare a document in \LaTeX detailing your group's design. Handout notes on \LaTeX available on Sakai.
6. Working as a group, perform your experiments. This should include:
 - Implementing Backtracking Algorithm. Your group must implement the code - it *may not* be downloaded from the web.

- A test sample database which will be used to store initial configurations. Test samples should be randomly picked from the database for testing. The size and structure of the configuration must be chosen carefully.
 - Obtaining experimental measurements of the performance of the algorithms with input sets of different inputs, picked up from test sample database, as per your experimental design.
 - Comparing your observation to the theoretical analysis of the Backtracking Algorithm for the given problem.
7. Prepare a group report in \LaTeX detailing the experiment your group has designed and performed. Make sure that you follow instructions which appear on the Sakai submission page. Your document should be written in the form of a laboratory report. You should discuss what you have done, why you have done it and how you have done it. This means discussing your methodology (designing and implementing your experiment) and how the results you get relate to what you are setting out to measure/verify.

Important Note: Each report should also contain details about each student contribution, which is agreed upon by the group members.

8. Submit this report on Sakai. The code you develop **should preferably** run on the equipment in the MS Labs. Your implementation will be verified during one of the sessions.

The STRICT deadline for this submission is Friday, 27th October 2017, 17:00 hrs

Late submissions will not be accepted and will be given 0%.

Marks distribution for your assignment:

Group mark: 10% (includes design, implementation, testing etc.)

Individual contribution: 5%

Total: 15%