ASSESSED

G52AIM Lab 1 – Hill Climbing
Report Exercise Sheet

1 Report [50 marks]

These questions are designed to test your knowledge and intuition. We are only looking for short 1 or 2-line answers. You may optionally include any of the following to complement your answers:

1. Drawings (i.e. pen and paper illustrations) of the search landscape.
2. Figures generated using the G52AIM framework; for example, boxplots or progress plots.
3. Statistical tests, ensuring you state the test used, the outcome of the test, and what it means!

The report template can be found on Moodle under the section Lab 01 and named `usernamehere-lab01-report.docx`.

2 Questions

1. The implementations of both DBHC and SDHC internally use an accept only improving moves strategy for their hill climbing procedures. How might this hill climbing strategy be changed (without accepting worse moves) to improve the performance of DBHC?
2. In some cases, the modification made in question 1 **might** also cause DBHC to perform worse. With specific reference to the search landscape features, why might this be the case?
3. Why does the modification made in question 1 **not** adversely affect the performance of SDHC? You should explain how SDHC works and why the implementation of SDHC with the modification will never perform worse than that implemented in the lab with accept OI moves.
4. Given an execution time of **1 second**, which of DBHC and SDHC, if any, performs the best for solving MAX-SAT problems? Remember that the objective is to **minimise** the penalty (number of broken clauses). You should use the supplied framework to validate your theory and provide any results to back up your answer.
5. Given an execution time of **20 seconds**, which of DBHC and SDHC, if any, performs the best for solving MAX-SAT problems? Remember that the objective is to **minimise** the penalty (number of broken clauses). As with question 4, you should use the supplied framework to validate your theory and provide any results to back up your answer.

3 Marking Criteria

1. Valid answer. [10 marks]
2. Valid answer. [10 marks]
3. Valid answer. [10 marks]
4. (same as 5.). [10 marks]
5. Correct answer using the results you have collected given a statistically valid reason. Extra marks are awarded for careful design of your experiments to answer the question. At this

point, we will emphasise "Given an execution time of x seconds, which of DBHC and SDHC, if any, performs the best for solving MAX-SAT problems?". [10 marks]

4 SUBMISSION

Deadline: Tuesday 13/02/2018 – 15:00

You should submit a single PDF file called **[username]-lab01-report.pdf** to Moodle under CW1b.