# DD2380 "ai13" PROJECT OPPOSITION REPORT

**Your group's name: MYNT**

**Other group's name: Deus Est Machina**

### Did the abstract provide an adequate summary of the report?

The abstract was good. It detailed all relevant parts of the solver, and the approach that the team took.

### To what degree did the author justify his/her choice of method of tackling the problem?

While there is no justification of why search in particular was used to tackle the problem, there is justification for various other parts of the solver, such as the motivation for speed based on the branching factor and depth, and the use of a global array for state storage, as well as the bit representation of states based on the speed requirements.

### Did the author discuss the extent to which the prerequisites for the application of such a method are fulfilled?

There appears to be no discussion of the prerequisites of applying search to a problem, although these are implicitly explained in the state expansion and description of other parts of the solver.

### Is the method adequately described?

The approach is well described, with the required components detailed, and some explanations of what the different parts of the approach are used for.

### Has the author set out his/her results clearly and concisely?

Results are clearly described, along with some attempts to explain the results obtained based on understanding of the limitation of the implementation.

### Do you consider the group's conclusions to be credible?

The analysis of the results leads to credible conclusions about the solver. The conclusions are derived from knowledge of the weak points of the solver.

### Which sections of the report were difficult to understand?

The section about the state representation could have been done with more detail. There is no explanation of the method used to translate between bit space and absolute coordinates, which seems to be a rather important part of the solver. The use of matrices is mentioned, but the computation of the matrices is not, and nor are there details of the method used to apply actions to the bit space representation.

## Other comments on the report and its structure.

Most of the report follows a reasonable structure, but the sections on static and dynamic deadlocks and search could be moved in such a way that the flow is more logical. The current order explains dynamic deadlocks after search, which seems like an odd choice given that the search takes into account dynamic deadlocks as well. There are some parts which appear to be missing an explicit citation, such as the mention of PSPACE. Some experiments would have been good to see more clearly the derivation of the nodes per second numbers.

## What are the stronger features of the report?

The evaluation shows a good understanding of the limitations of the approach. The report indicates a systematic approach to solving the problem, with clearly structured implementation requirements.

## What is your concluding assessment of the report?

A satisfactory report overall. The report in general shows a thorough understanding of the problem to be solved, and good ideas about how to deal with the specific difficulties of the problem. Good indication that the work was well planned, other than the switch from Java to C++ having already written what could be considered a complete solver.

## Did the result that they present match what you expected given the description of the method

The results presented are to be expected from the description in the report. Very fast node expansion should allow for the solution of the majority of maps, but may struggle with those which require a more systematic approach to solving, especially since the heuristic evaluation is quite simple.

## What are the strongest aspects of the agent

The speed of expansion is definitely the strongest aspect. This can be put down to the efficiency of the state representation.

## What are the weakest aspects of the agent

Given that so many nodes are being expanded per second, it seems as though more maps should be solvable. In this sense, the heuristic is probably the weakest aspect, as it does not seem to drive the search in particularly good directions to reach a solution quickly.

## What would you recommend to be change to gain performance

An improvement to the heuristic would be the ideal thing to do. The authors mention several other potential improvements such as tunnel macros which could lead to further performance gains.

## How well do you think that the agent did in the evaluation (performance)?

The agent did quite well, given that it solved almost all the maps in the test set, and 63 of those in the kattis set.

## Concluding remarks about the work

The bit representation is an interesting approach, although perhaps other parts of the agent were neglected because the focus was on this representation. We would question the switch from Java to C++ after what seems like a significant amount of code had already been written, but it seems as though it did not cause many problems, and the issues with the Java implementation led to a better implementation in C++. It was interesting to see an approach which relied on the speed of node expansion. Having looked at the code, there is a distinct lack of commenting, which severely hampers understanding of what is going on in the code.

**Questions to author:**

**1**

"requires a deep understanding of the game to be effective" - is this necessarily the case? Understanding how the game works even on a basic level allows you to come up with good techniques to solve the problem.

**2**

"streamline the search through heuristics and planning" - define planning? Search with a heuristic is not planning.

**3**

Explain in more detail the state representation, in particular the matrix construction. We assume the matrix is constructed once at initialisation of each map? What is the structure of the matrix? How are different operations on the bit representation done?

**4**

The state itself acts as a node in the search. In software engineering terms this seems like an odd decision. Any particular reason for the choice? Would make more sense to have a separate node structure which deals with storing the heuristic score and parent node, etc. Something to do with the state representation choice?

**5**

How were the numbers for the node expansion rate computed?

**6**

7

**Mark most appropriate grade for the report (in your opinion):**

| F | 3 | 4 | 5 |
|---|---|---|---|
|   |   |   |   |

**Mark most appropriate grade for the work (in your opinion):**

| 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
|   |   |   |   |   |   |

# COMMENTS ON PRESENTATION

(these written comments are to be handed over to the lecturer at the end of the session)

**Name of your group:**

**Name of the group that presented:**

## Introduction

## Presentation of achievements

## Conclusion

## Did you hear what they said? Did they use the voice in way to avoid you falling asleep?

## Commitment and contact with the audience

## Use of overheads/slides or other aides

## Overall assessment:

**Mark most appropriate grade for the presentation (in your opinion):**

| F | 3 | 4 | 5 |
|---|---|---|---|
|   |   |   |   |

Your duties as an opponent

- Critically review the report in question
- Pay particular attention to the problem approach, the methodology chosen and to the interpretation/evaluation of results
- Complete this Opponent Record up to the comments on presentation before the presentation. You can use a computer (very much preferrable) or black ink by hand (must be readable!).
- At the  presentation have 2 copies of the document, one  to be handed over to the lecturer and one for the group you oppose so that they get feedback from you. The comments on the presentation only need to be provided on one of the copies (as it is completed after the presentation and cannot be prepared in advance)
- Orally present your general opinion of and comments on the work, report and presentation after the other group's presentation.
- Put questions to the author's of the report following their presentation: you may put forward the questions set down in the Opponent Record, or some of these questions, but it is also reasonable to expect the presentation to generate new questions. We expect everyone in the group to take part in generating new questions.
- Give personal, written comments on the verbal presentation held following the project you are opposing.
- Complete the comments on the presentation after the presentation and hand in to the lecturer as soon as possible after the presentation (minutes not hours).

Attempt to answer the questions in the Opponent Record in relative detail. Answers such as **Yes** and **Good** are insufficient.