A2 FAQ

This is a compilation of frequently asked questions regarding Assignment 2. Please study it in detail **before** you ask a question online on Canvas. It might already have been answered.

We are covering the following categories:
Technical questions: These questions center around technical issues such as "How do I get the code to run on my operating system?".
Theoretical questions: These questions center around theoretical issues such as "I did not understand the difference between observations and states, is there any?". Some theoretical misunderstandings might lead to practical problems, so check this one as well when you are in trouble!
Practical questions: These questions center around practical issues such as "What do I have to do to achive X grade"?

1 TECHNICAL QUESTIONS

These questions center around technical issues such as "How do I get the code to run on my operating system?"

Question 0: We obtain Time Limit Exceeded in Kattis even though we set our code to return when we are close to the deadline. Why could that happen? As this algorithm is recursive if you return from a function call deep in the hierarchy you still need to do multiple returns until you get to the root call. As an example, if I call the function **foo() 100 times** recursively and have a flag for returning when I am **10ms before a deadline** and each return statement takes around **0.1ms** I could expect that sometimes I will not respect that deadline.

We get time limit exceeded in Kattis using search depth of 2 when implementing 3D TTT. How can we solve this problem? Probably, the time limit exceeded exception is due to that your solution goes through too many states during the search. You should implement pruning and/or one or several optimizations to your algorithm that were discussed in class (repeated state checking, move ordering, etc) in order to fix it.

Our code is inches away from obtaining the required score, and algorithm upgrades cannot improve it. Consider looking more into the heuristic that you use and working on its improvement. It is also common to miss some of the winning ways in the classical heuristic.

2 THEORETICAL QUESTIONS

These questions center around theoretical issues such as "I did not understand the difference between observations and states, is there any?".

Question 0: Using hash maps made our algorithm slower instead of speeding it up. Why could that happen? There could be mainly two reasons for that:

- The keys you are generating are too big: Consider not using very big strings as keys.
- You are using a key for each state: Consider using a key to multiple states (taking advantage of collisions with a coarse-fine search approach).

3 PRACTICAL QUESTIONS

These questions center around bureocratic issues such as "What do I have to do to achive X grade"?

Question 0: Is it required to use the MiniMax (+ Alpha-Beta pruning) to solve the assignment or could we use other algorithms such as MC tree search? Yes, you should use the algorithms taught in the course to solve the assignment so that you can be evaluated in your knowledge of them. However, you can invest some time in these other algorithms for your project.

Question 1: Are there any requirements to which depth the search algorithm should go? There are no specific requirements. However, to have an actual tree search algorithm, the minimal depth must be at least 1.

Question 2: Do I need to implement all discussed improvements to the algorithm in order to aim for a high grade? If your solution achieves needed amount of points, having only some of the improvements might be fine. However, trying out more things is encouraged.