TDT4136 - Assignment 1

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1 Tasks

1.
   - ”intelligence demonstrated by machines” from https://en.wikipedia.org/wiki/Artificial_intelli first paragraph.
   - ”AI is whatever hasn’t been done yet [in the broader field of what is usually considered AI].” from https://en.wikipedia.org/wiki/Artificial_intelligence, second paragraph
   - ”the capability of a machine to imitate intelligent human behavior” from https://www.merriam-webster.com/dictionary/artificial%20intelligence, second definition.

2. The turing test is a test of a machienes ablilty to demonstrate intelligent behaviour indistinguishable from a human, usually (theoretically or practically) conducted by letting a human evaluator communicate with an agent through text. The evaluator aims to determine whether the agent is a human or an AI. If the AI is able to imitate the human well enough for the evaluator to not be able to determine whether it is communicating with a human or an AI, the AI passes the test.

3. Thinking rationally is not a criterion for acting rationally (it may not even include any more ’thinking’ than a mechanical direct response). Similarly, while thinking rationally may enable rational action, one need not act rationally despite thinking rationally.

4. Rationality is ’doing the right thing’ with respect to optimizing some parameter based on the information given.

5. Aristotles’ good person was a person acting rationally based on their knowledge. This knowledge was to be based on correct reasoning (logic), for which he postulated (mathematically interperable) ground rules.
   I was not able to find anyhing relating to ”The first AI researchers do implement these ideas”. Having read ”History of AI” on wikipedia, one could say it was anyone from ancient philosophers to Lovelace or Turing...

6.
   - The robot might be rational. Nothing indicates it should have had any knowledge about the helicopters imminent crash.
   - The robot is probably not rational, as is either did not use (or chose to ignore information from) the action look-left-look-right.

7.
   - It would not be rational as it would continue to move after having cleaned all squares.

- In most cases the agent would either never stop moving, or that it might halt before it is finished, as it has no way of saving its state. By allowing the agent to chain actions as a single action, however, it can be rational: If (clean): (Move, suck, halt) else (suck, move, suck, halt).
- Yes, this agent can always be rational. If (this square dirty): suck; elif (other square dirty): move; else halt.

8. The environment is:

   - Partially observable: It cannot observe the state of the other tile
   - Single agent: There are no other agents
   - Deterministic: The environment is deterministic
   - Sequential: The decisions are chained and affect future decisions
   - Static: The environment does not change at all (except when te robot is acting on it)
   - Discrete: There are no continuous states, even time is measured per-action.

9.

	Advantage	Limitation
Simple reflex	Simple and often predictable	Has difficulties with partially observable environments and might get into infinite loops
Model based reflex	Can handle partially observable environments	Requires a model of the world and possibly a large set of condition-action rules
Goal-based	Handles partial observability and complex interactions without a large condition-action ruleset	Requires a world model, a model of how actions influence the world and possibly long term planning
Utility based	Handles partial observablity and partial fullfillment of goals. Might reduce long term planning with a good utility function	Requires a world model, a model of how actions influence the world and the definition of a good utility function