5COM2003: Artificial Intelligence

Worksheet 5
Mark Scheme

General Marking Instructions:

- Please provide reasoning for your marking decisions in the form of full sentences.
- Be polite in giving feedback.
- If you do not understand something or are unsure what something does, please state it.
- You should be able to run the code they provided yourself, so you should be able to check if the result is correct.
- Continuation errors only count once. (Sometimes this is tricky, yes.)
- If in doubt state your uncertainty.
- If you really can not figure out what is happening and you can not grade the work send me an email f.riegler@herts.ac.uk and we see how to proceed. (I expect you put in some work before doing this.)

We are returning to GridWorlds, but this time with a more formal understanding after looking at the perception action loop to see how information gets processes between agent and environment(world).
The agent and the world should be separate classes!

Building our system parts

1. (2 marks) Build an 6x4 GridWorld containing an agent in a random field as well as 10 randomly distributed food pieces.
   Another random field should be a goal state.
   Random here should not be a decision but happen at creation time of the world.

   1M for a world of the correct size with the correct number of food pieces in it and a goal.
   1M for the random placements of these (each time a new world is created).
   -2M if the agent and the world are not separate objects.

2. (3 marks) The agent can choose between five action:

   - It can decide to attempt to move in any of the usual four directions, moving into a wall resets the agent to the field they were in before (bouncy as before).
   - It can decide to attempt to consume food, removing it from the world.

   The agent can sense two things:

   - When they stand on top of the goal

- When there is food adjacent or below them

Count how much food the agent has consumed.

1M for an agent that can make these five decisions (but does not realise (affect change) itself)
1M for the sensing abilities 1M for a food consumed counter

3. (2 marks) When the agent attempts an action the world displays the following dynamics:
   - When the agent decides to consume food and there is food, the agent consumes the food. No protest here. Plain determinisms.
   - When the agent decides to move in a direction, 50% of the time nothing happens instead. 50% the movement happens.

1M for the world acting upon the agent's decision
1M for implementing it as stated above.

The agent's decision making

4. (4 marks) The agent has a very simple decision making with this order of priorities:
   1. If the agent is in the goal the agent cannot move any more and the episode ends.
   2. If the agent is on a field with food, the agent decides to consume food.
   3. If the agent is adjacent to a field with food (the agent senses food), the agent decides to move in the direction of the food.
   4. Otherwise, the agent searches for food by walking randomly.

1M the episode ending once the agent reaches the goal. It does not matter if this is in the agent or in the world or some other class. This would be beyond the normal scope of behaviour anyway.
1M for the agents acting upon food, both on its field and on an adjacent field. Be careful the agent only consumes food if there is actually food.
1M for the agent walking randomly otherwise.
1M If all of this happens in the correct order

11 total marks are available.

Have a wonderful day :)