

Question 1

- a) Could you give a definition of an agent?
- b) How would you describe a multiagent system?

Question 2

Consider the environment $Env_1 = \langle E, e_0, \tau \rangle$ defined as follows:

$$E = \{e_0, e_1, e_2, e_3\}$$

$$\tau(e_0 \xrightarrow{\alpha_0}) = \{e_1\}$$

$$\tau(e_0 \xrightarrow{\alpha_1}) = \{e_2, e_3\}$$

There are two agents possible with respect to this environment, which is referred to as Ag_1 and Ag_2 :

$$Ag_1(e_0) = \alpha_0$$

$$Ag_2(e_0) = \alpha_1$$

Assume the probabilities of the various runs are as follows:

$$P(e_0 \xrightarrow{\alpha_0} e_1 | Ag_1, Env_1) = 1$$

$$P(e_0 \xrightarrow{\alpha_1} e_2 | Ag_2, Env_1) = 0.2$$

$$P(e_0 \xrightarrow{\alpha_1} e_3 | Ag_2, Env_1) = 0.8$$

Finally, assume the utility function u_1 is defined as follows:

$$u_1(e_0 \xrightarrow{\alpha_0} e_1) = 8$$

$$u_1(e_0 \xrightarrow{\alpha_0} e_2) = 7$$

$$u_1(e_0 \xrightarrow{\alpha_0} e_3) = 9$$

- a) Is this a decision-making problem or a problem of strategic interaction? Explain the variables used. What are the requirements for maximizing expected utility?
- b) Given these definitions, calculate the expected utility of agent Ag_1 and Ag_2 with respect to Env_1 and u_1 . Which agent is optimal with respect to Env_1 and u_1 ?

Question 3

- a) What do we mean by the intentional stance?
- b) Explain the benevolence assumption?
- c) What do we mean by communication in MAS?
- d) How could result sharing improve group performance?