COMP310 – Multi Agent Systems
Tutorial Week 2 Exercises

Question 1:

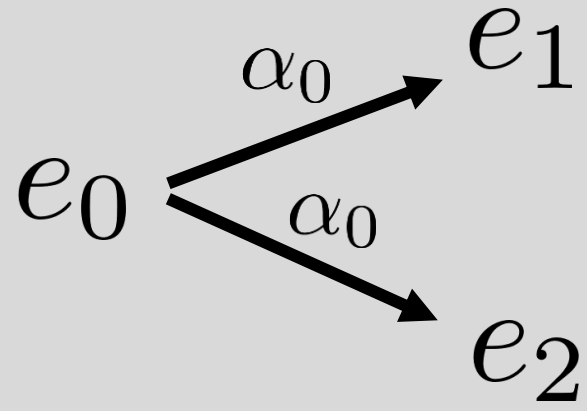
Consider the following Environment:

$$Env = \langle E, e_0, \tau \rangle$$
$$E = \{e_0, e_1, e_2, e_3, e_4, e_5\}$$
$$\tau(e_0 \rightarrow^{\alpha_0} = \{e_1, e_2\}$$
$$\tau(e_0 \rightarrow^{\alpha_1}) = \{e_3, e_4, e_5\}$$
$$Ag_1(e_0) = \alpha_0$$
$$Ag_2(e_0) = \alpha_1$$

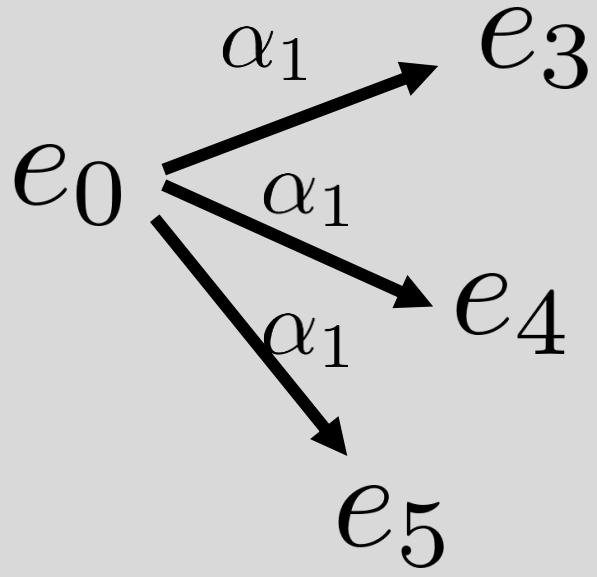
Create **graphs** that detail the runs of each agent

Question 1 Solution

Ag_1



Ag_2



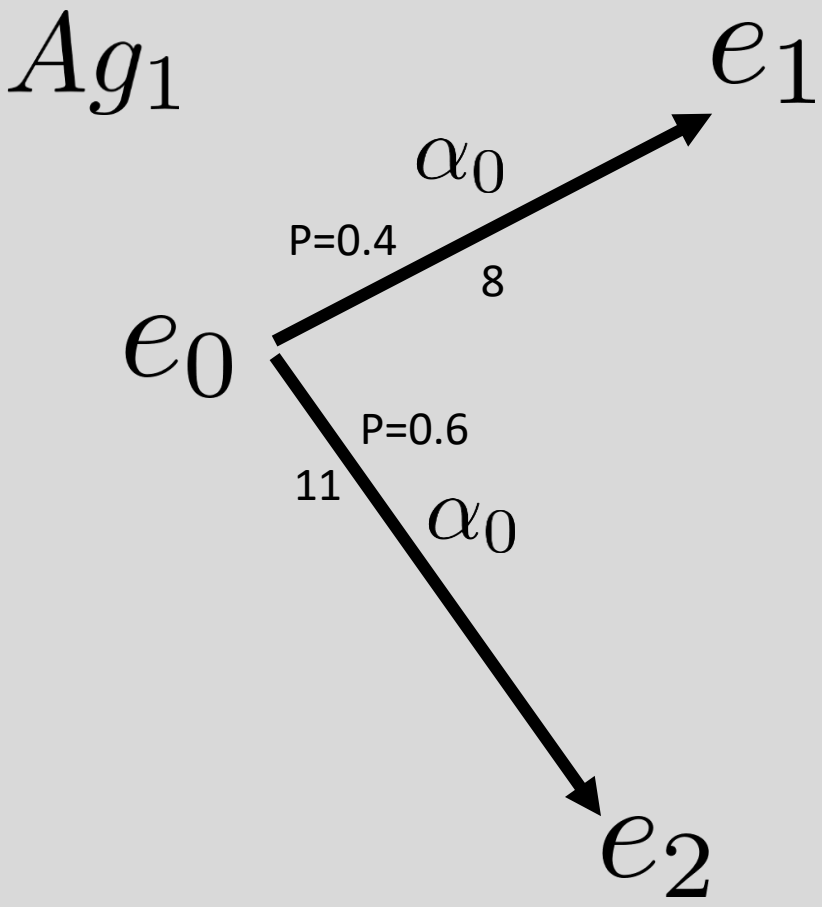
Question 2

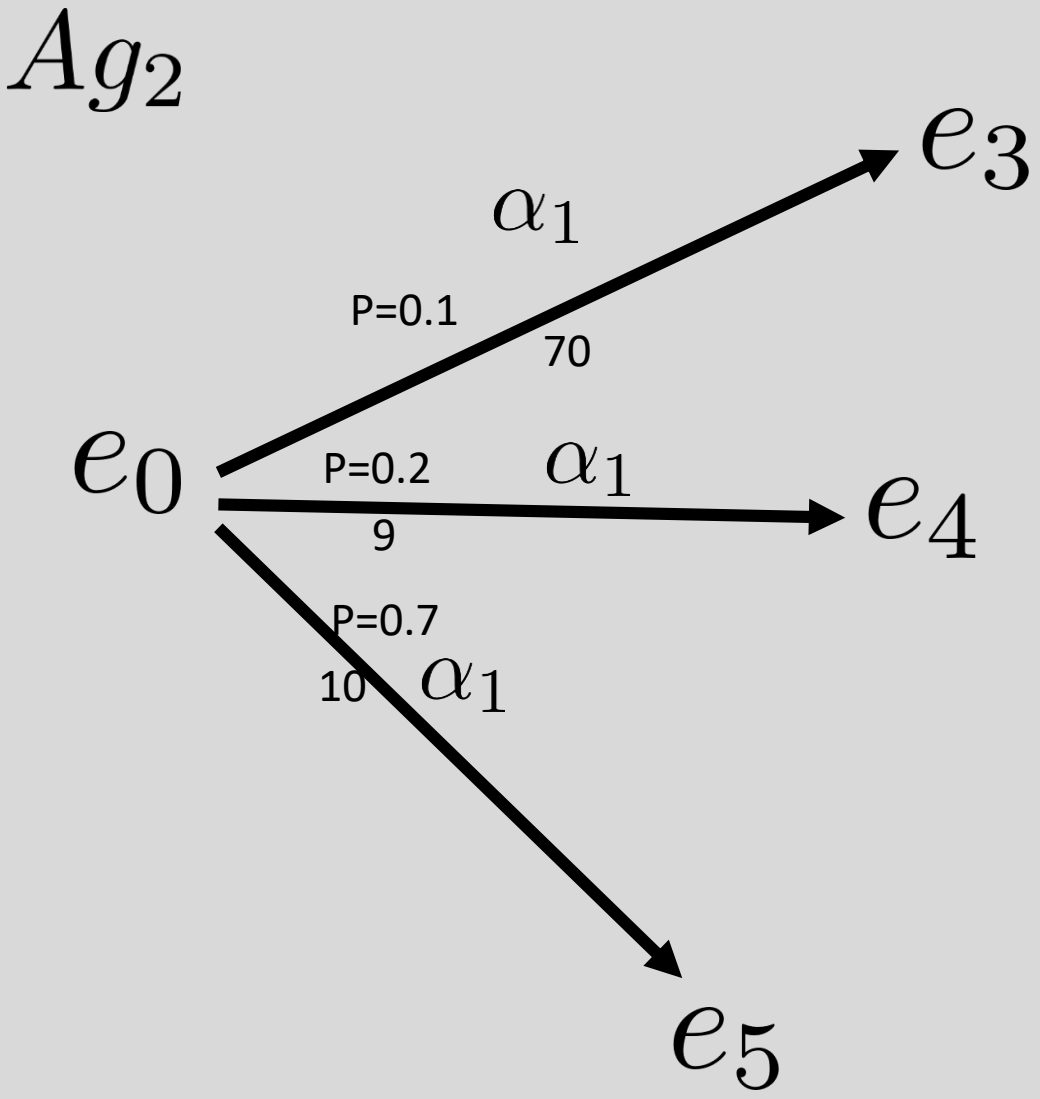
Question 2:
Consider the following Probabilities and Utility Functions:

$$P(e_0 \rightarrow^{\alpha_0} e_1 | Ag_1, Env) = 0.4$$
$$P(e_0 \rightarrow^{\alpha_0} e_2 | Ag_1, Env) = 0.6$$
$$P(e_0 \rightarrow^{\alpha_1} e_3 | Ag_2, Env) = 0.1$$
$$P(e_0 \rightarrow^{\alpha_1} e_4 | Ag_2, Env) = 0.2$$
$$P(e_0 \rightarrow^{\alpha_1} e_5 | Ag_2, Env) = 0.7$$
$$u(e_0 \rightarrow^{\alpha_0} e_1) = 8$$
$$u(e_0 \rightarrow^{\alpha_0} e_2) = 11$$
$$u(e_0 \rightarrow^{\alpha_1} e_3) = 70$$
$$u(e_0 \rightarrow^{\alpha_1} e_4) = 9$$
$$u(e_0 \rightarrow^{\alpha_1} e_5) = 10$$

Add to your graph, the probabilities and utilities of the runs

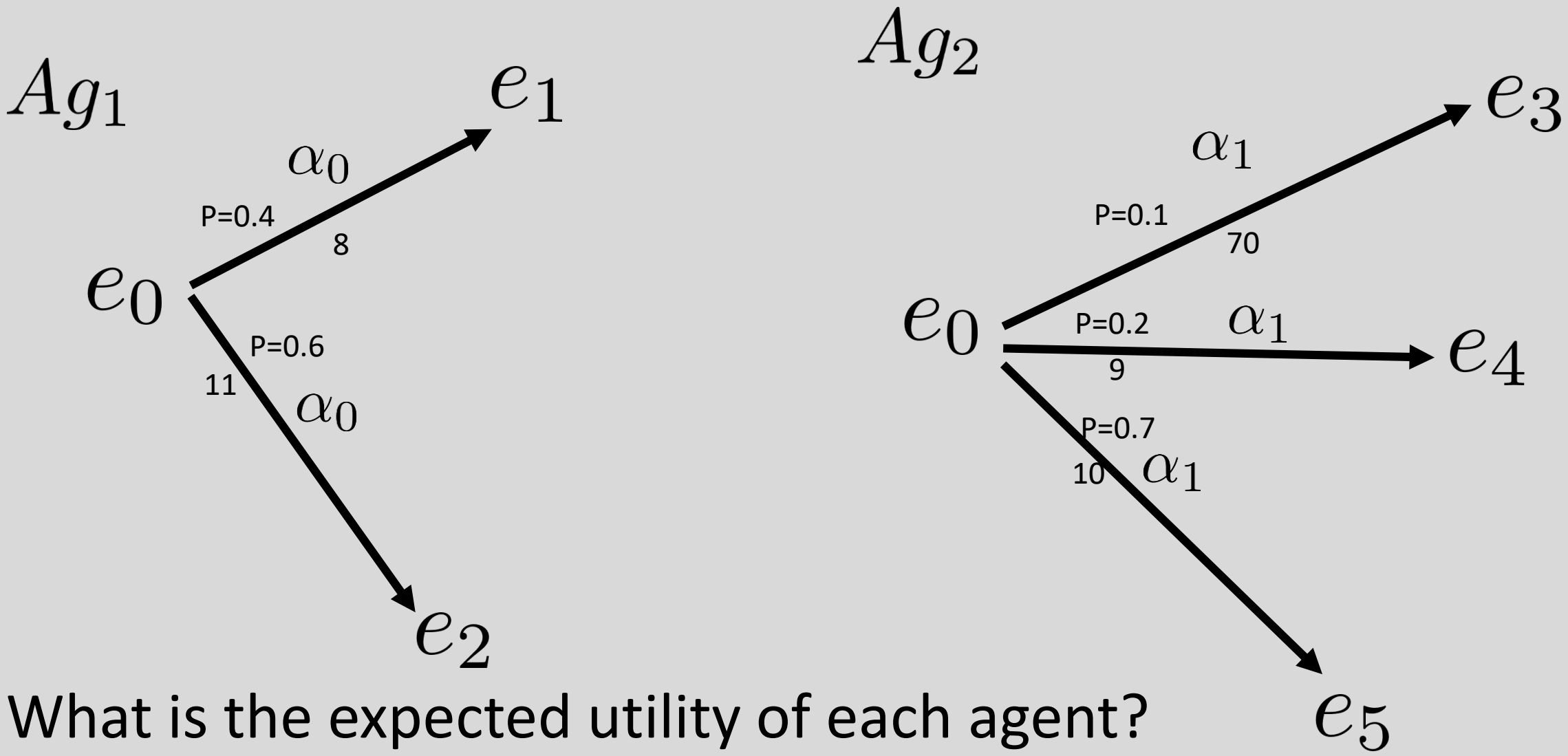
Question 2 Solution


Ag_1
e_1
α_0
P=0.4
8
e_0
P=0.6
11
α_0
e_2


Ag_2
e_3
α_1
P=0.1
70
e_0
P=0.2
α_1
e_4
9
P=0.7
10
α_1
e_5

Question 3

Question 3:
Consider the following graph (solution from prev questions)



What is the expected utility of each agent?

Question 3 Solution

Ag1:

$(0.4*8) + (0.6*11) = 9.8$

Ag2:

$(0.1*70) + (0.2*9) + (0.7*10) = 15.8$