If a collection of events are **mutually exclusive**, *then the probability of the conjunction of those events is...*

1

If a collection of events are **jointly exhaustive**, *then the probability of the disjunction of those events is...*

2

When does a collection of events form a **partition***?*

3

Name some types of actuator that might be found on a robot.

4

Name some types of sensors that might be found on a robot.

5

Name two things that may cause the robot to incorrectly percieve its location.

6

What is a pose?

7

Describe baysian updating.

8

1

2

- *Stepper motors*
- *DC motors*
- *Artificial muscles*
- *Hydraulic controls*

4

- *The sensors are noisy*
- *The robot may sometimes move a greater or lesser distance than it intended*

6

If an agent recieves new information in the form of an Event E, then the agent should update it's degrees of belief by conditionalising it's probability distribution on E.

8

0

1

When the events are both mutually exclusive and jointly exhaustive.

3

- *Camera*
- *Bumpers*
- *Range finders (infra red, sonar, laser)*
- *Light detectors*

5

A collection of three integers, representing the x position, the y position and the angle of rotation of the robot.

7

If an agent recieves two events E_1 and E_2, and conditionalises on them both, does the order in which it conditionalises it's probability distribution on the events mattter?

9

State the formula for total probability.

10

What is the formula for Bayes theorem?

11

What is the partition version of the formula for Bayes theorem?

Where:

- *E is an event.*
- *$E_0 \dots E_n$ are events that form a partition over Ω.*

12

What's the difference between a cumulative distribution function and a probability mass function?

13

What is the definition of conditional probability?

14

We can find out the probability of the event E if we have the conditional probabilities of it with another set of events $E_0, E_1, \ldots, E_n$ that form a partition on the sample space:

$$p(E) = p(E|E_0)p(E_0) + p(E|E_1)p(E_1) + \ldots + p(E|E_n)p(E_n)$$

10

Nope.

9

$$p(E) = \frac{p(E|E_i)p(E_i)}{p(E|E_0)p(E_0) + \ldots + p(E|E_n)p(E_n)}$$

12

$$p(E) = \frac{p(F|E)p(E)}{P(F)}$$

11

$$p(F|E) = \frac{p(F \wedge E)}{p(E)}$$

14

The cdf is cumulative, and shows the total probability of the outcomes up to and including the outcome it takes. The pmf shows only the probability of that outcome.

13