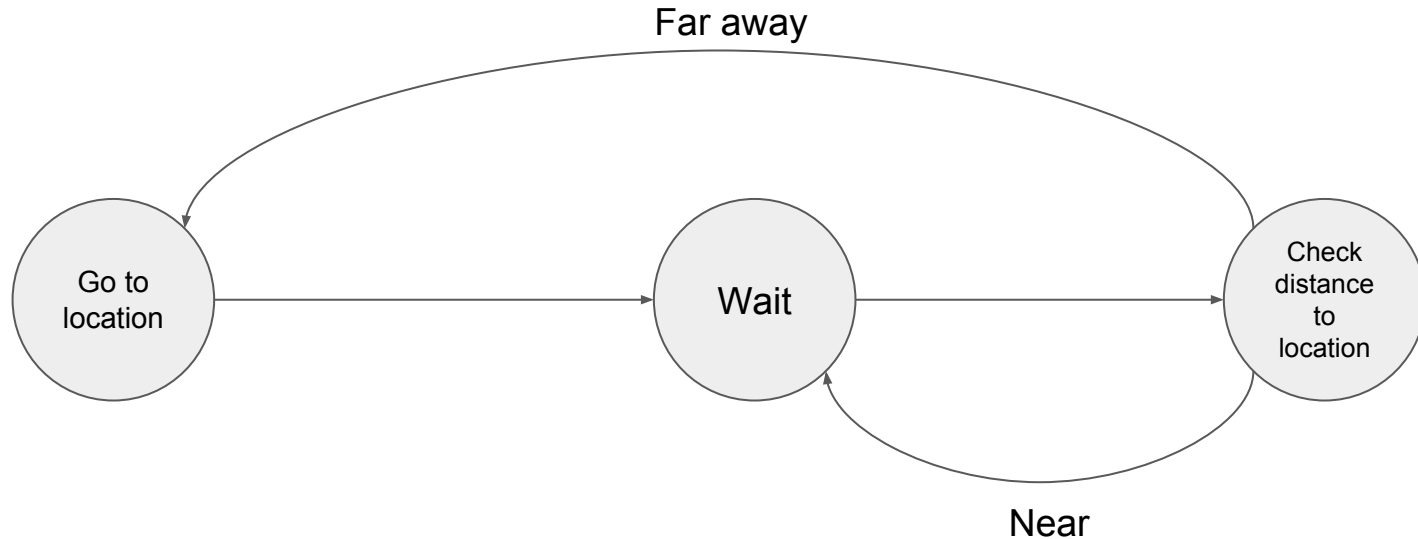


Intro to SAMI Petri Nets (SPNs)

The language you will learn is named “SAMI Petri Nets”, or SPN, which is based on the based on the “Petri Net” mathematical modeling language. In this lesson you will learn about the building blocks of the Petri Net language.

We will learn the language by incrementally building up an example team plan, adding features of the language to the team plan as we learn them.

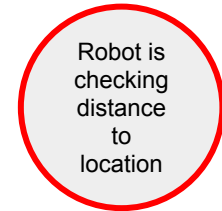
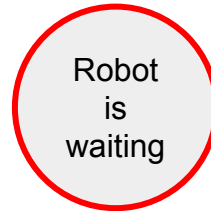
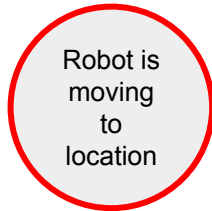
Let's start with a team plan that only considers one robot and no humans. Consider the goal of having the robot “station keep” around a location, periodically checking if it has drifted away from its location and moving back if necessary. Drift could be caused by water current, terrain slope, wind, or many other factors. The logic for such behavior would look something like this:



Now we will begin to represent the diagram using a SAMI Petri Net (SPN).

3 key building blocks of SPN are:

- **Places**: describe the status of the system

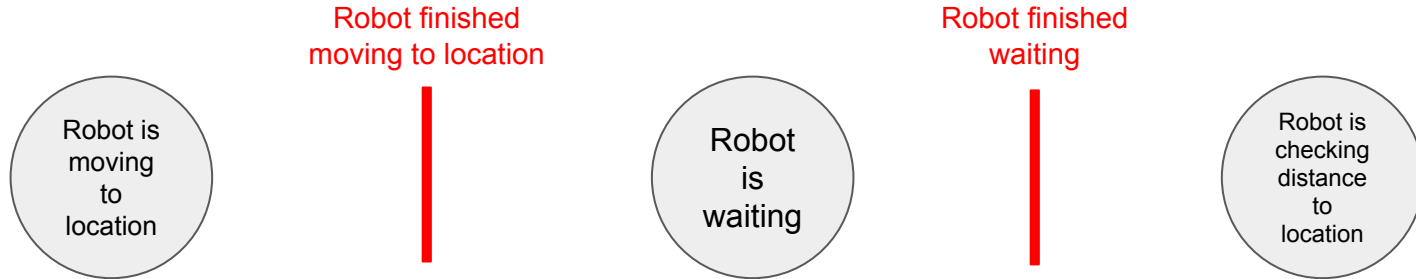


Represented by circles

Now we will begin to represent the diagram using a **SAMI Petri Net (SPN)**.

3 key building blocks of **SPN** are:

- **Places**: describe the status of the system
- **Transitions**: describe a change in the system

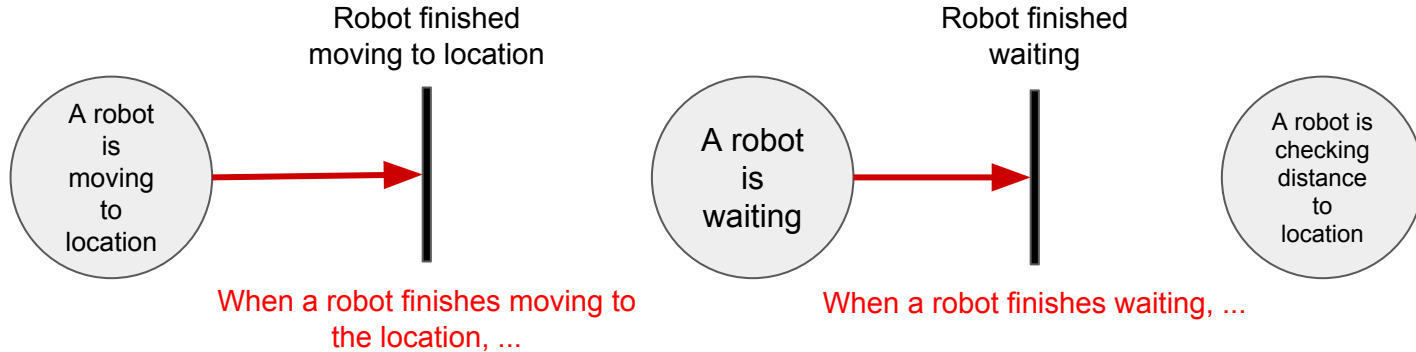


Represented by vertical lines

Now we will begin to represent the diagram using a **SAMI Petri Net (SPN)**.

3 key building blocks of **SPN** are:

- **Places**: describe the status of the system
- **Transitions**: describe a change in the system
- **Edges**: describe how a change affects the status of the system
 - **In Edges** connect a place to a transition

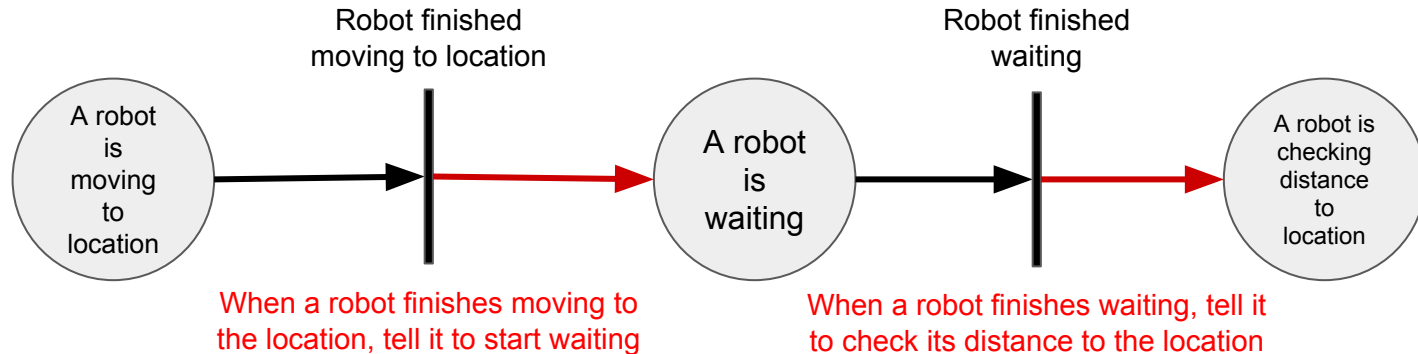


Represented by arrows

Now we will begin to represent the diagram using a **SAMI Petri Net (SPN)**.

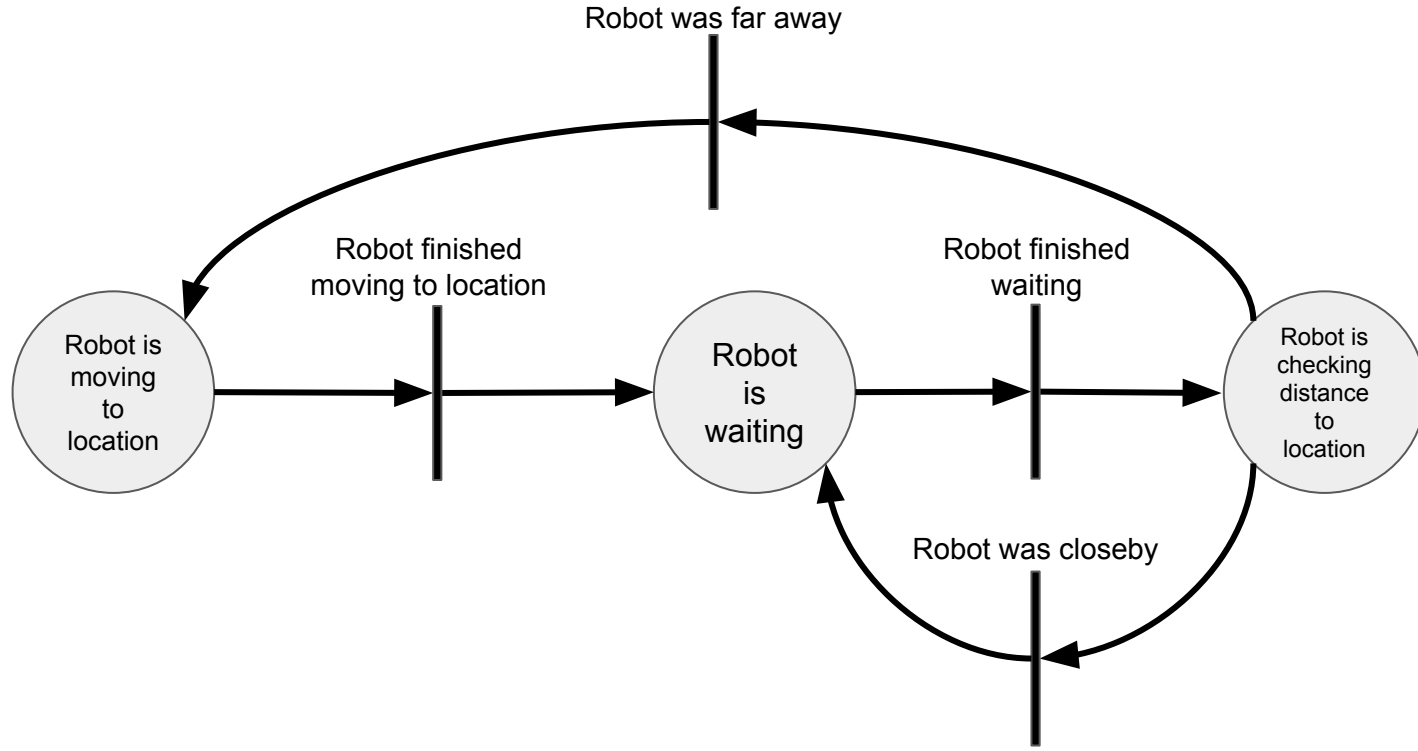
3 key building blocks of **SPN** are:

- **Places**: describe the status of the system
- **Transitions**: describe a change in the system
- **Edges**: describe how a change affects the status of the system
 - **In Edges** connect a place to a transition
 - **Out Edges** connect a transition to a place



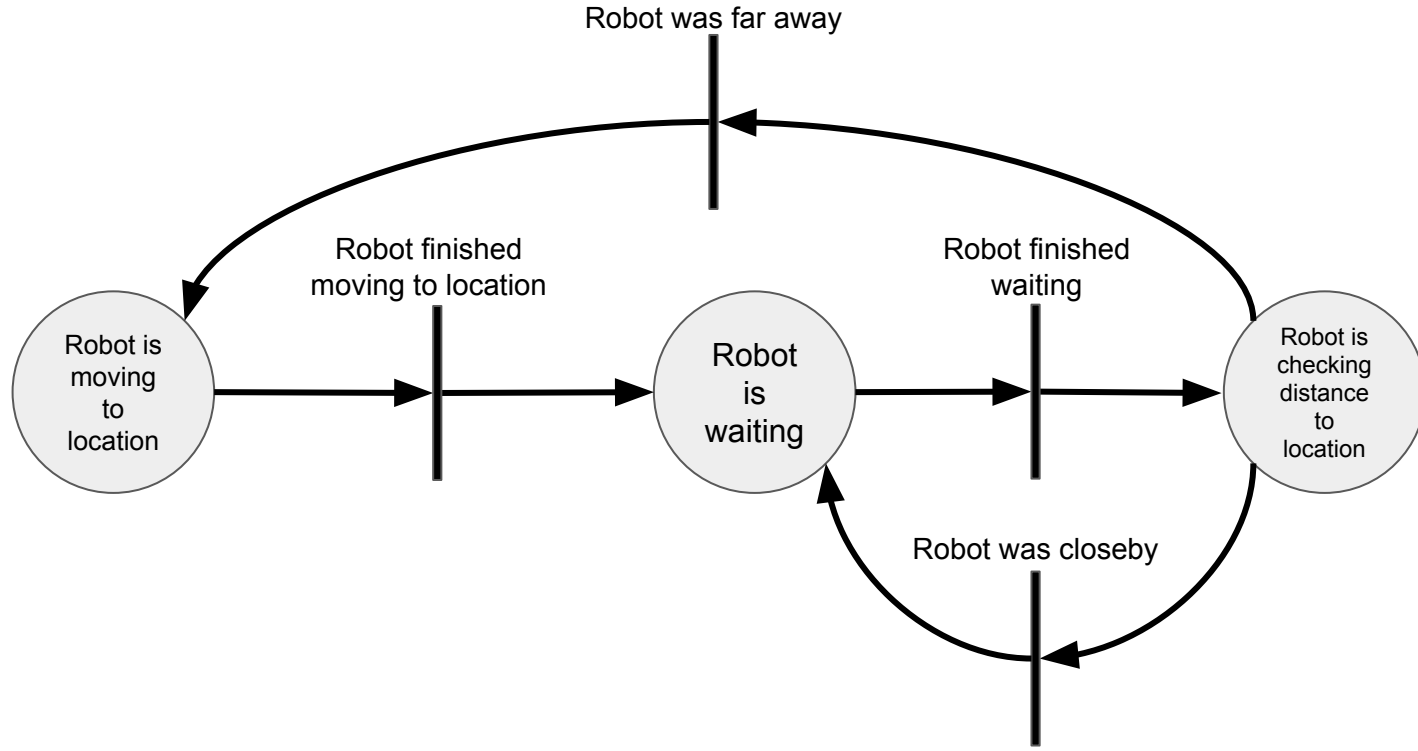
Represented by arrows

The final set of **places**, **transitions**, and **edges** would look like this

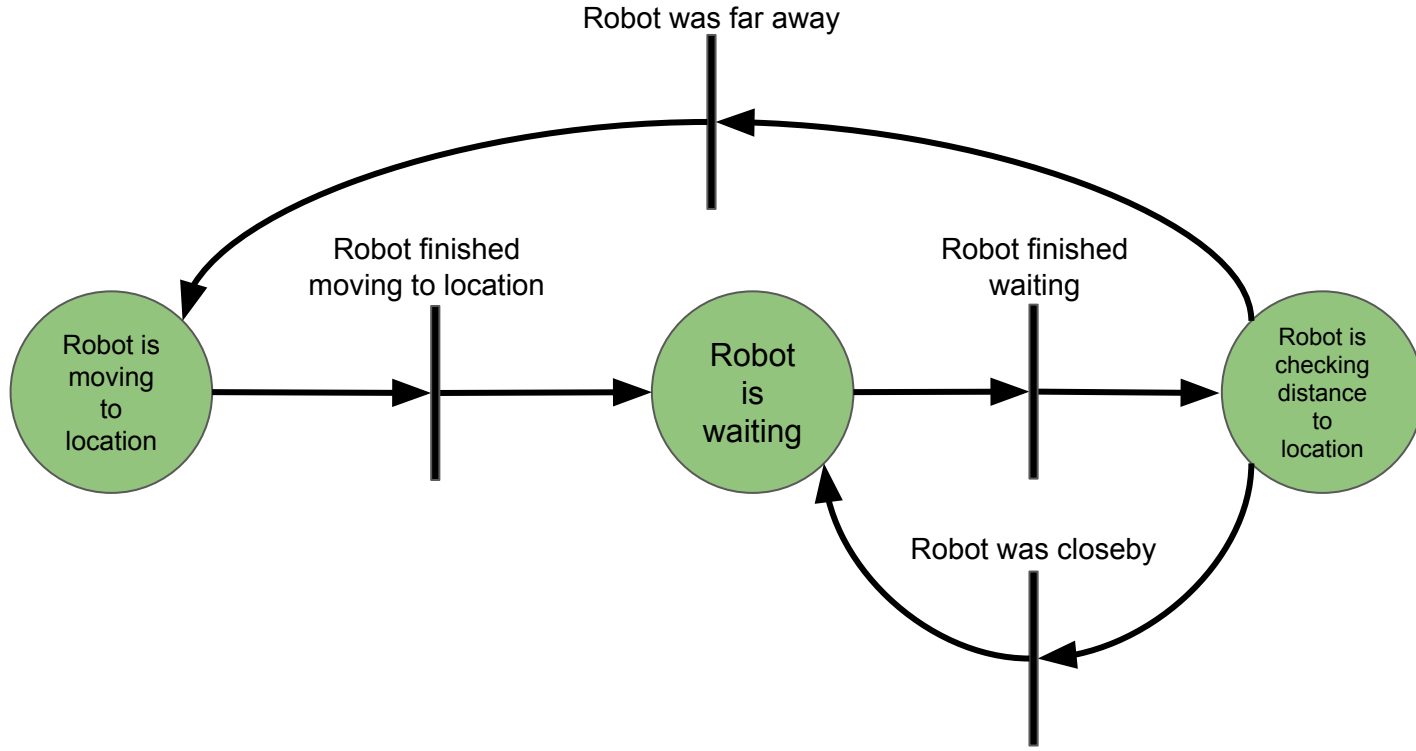


Now you will answer some questions about the SPN language to evaluate how well the lessons have worked. When a quiz shows up, fill in your answer on the corresponding print out. Then you can go to the next slide, which contains the answer. After the lesson is complete, we will briefly discuss the questions.

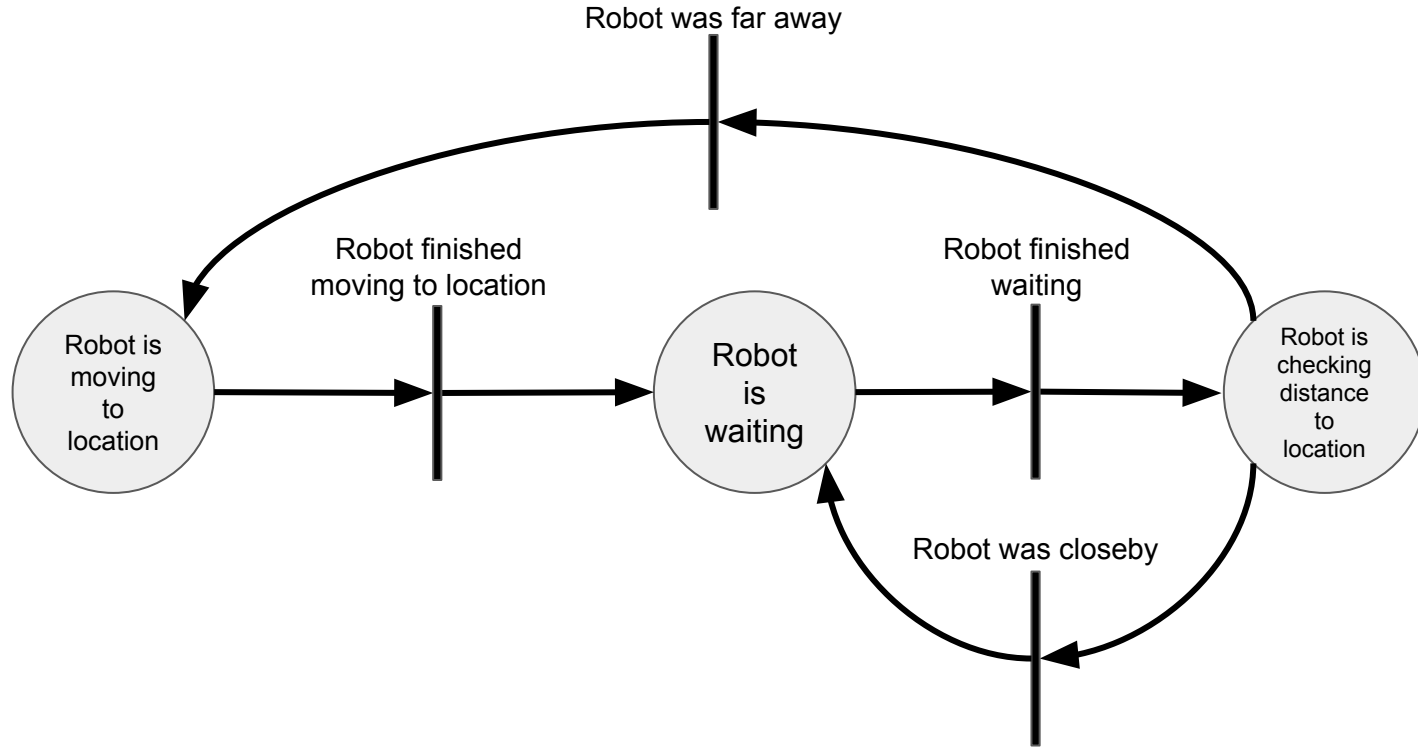
Quiz 2-1: Identify the places



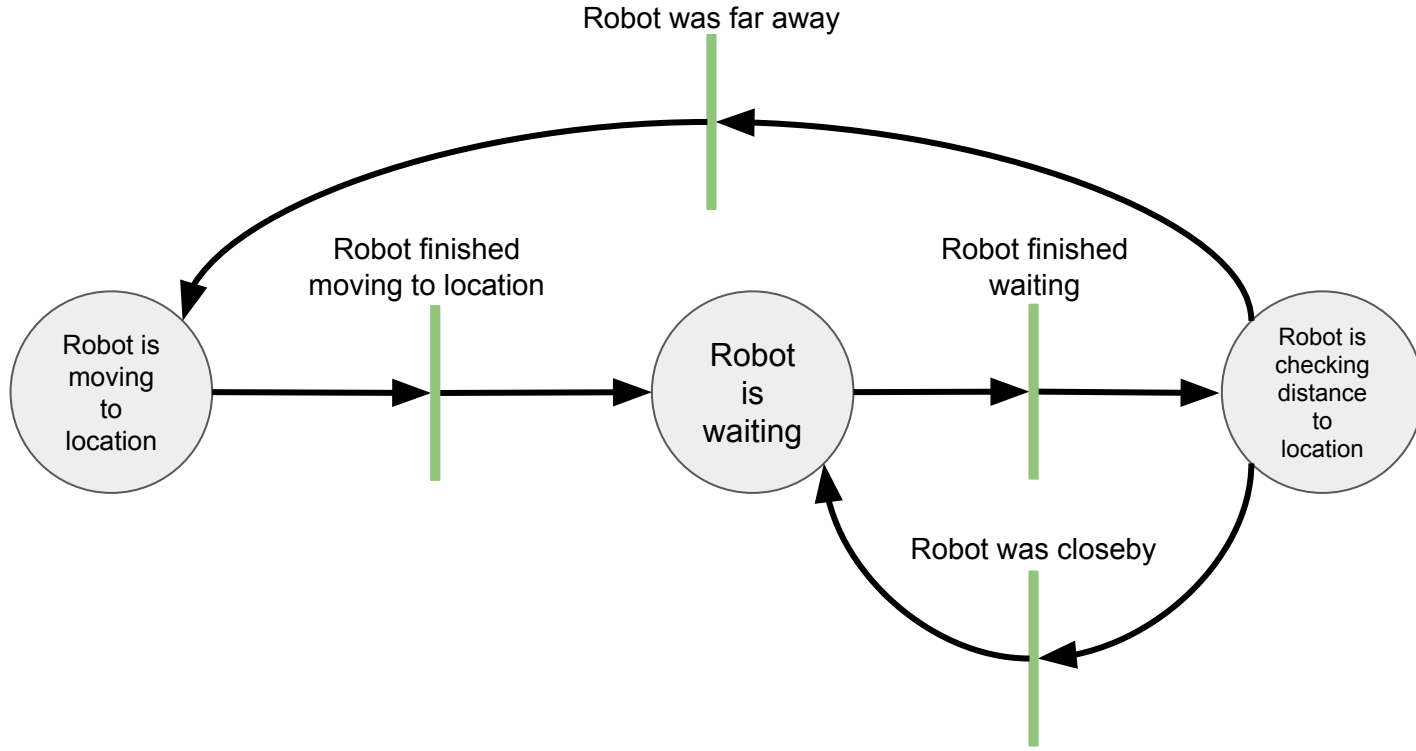
Quiz 2-1 Solution



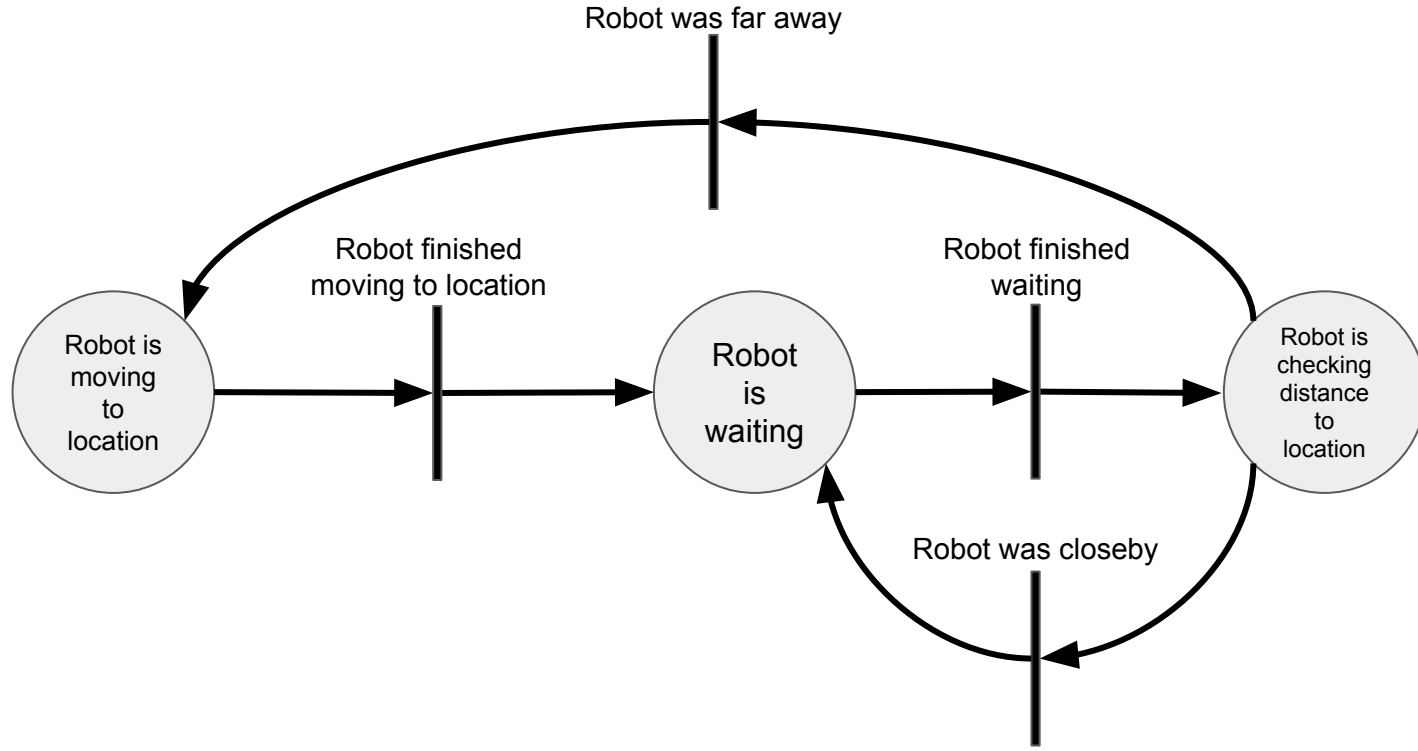
Quiz 2-2: Identify the transitions



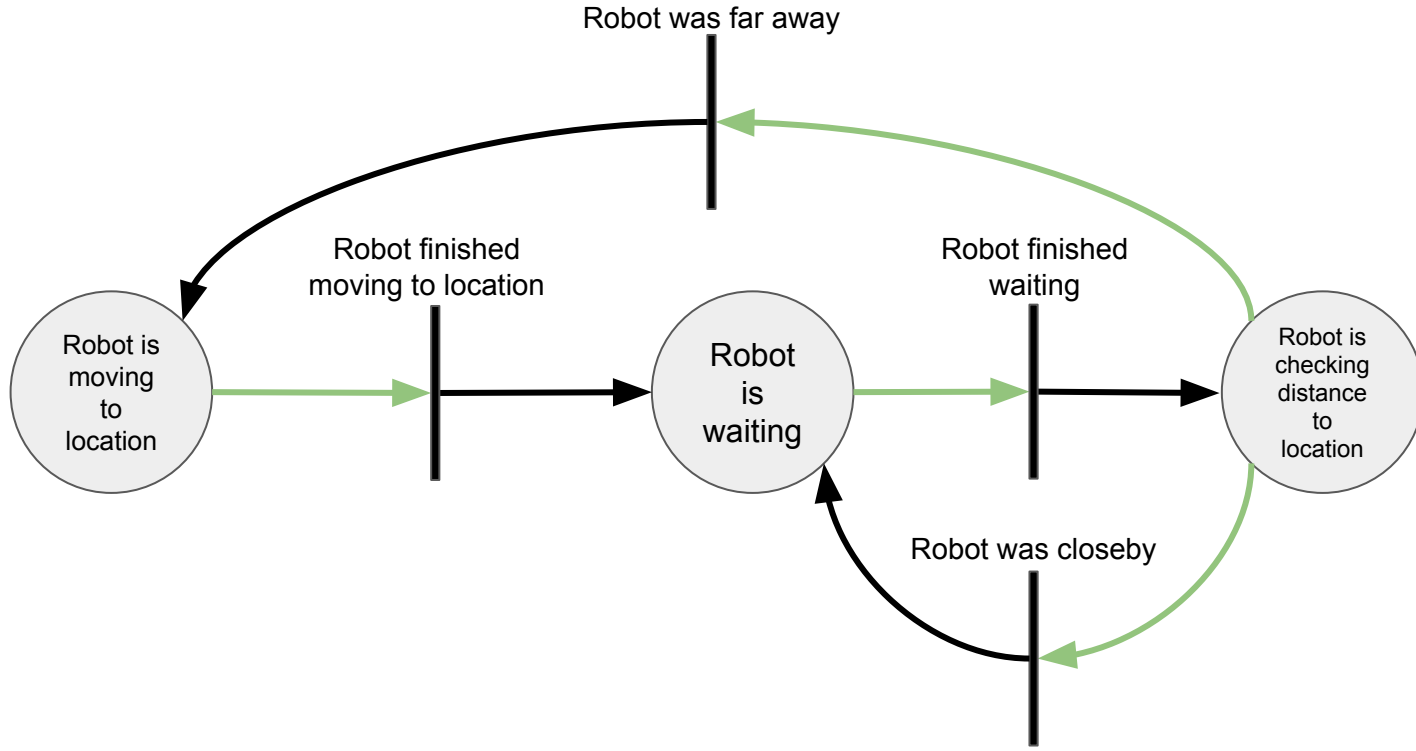
Quiz 2-2 Solution



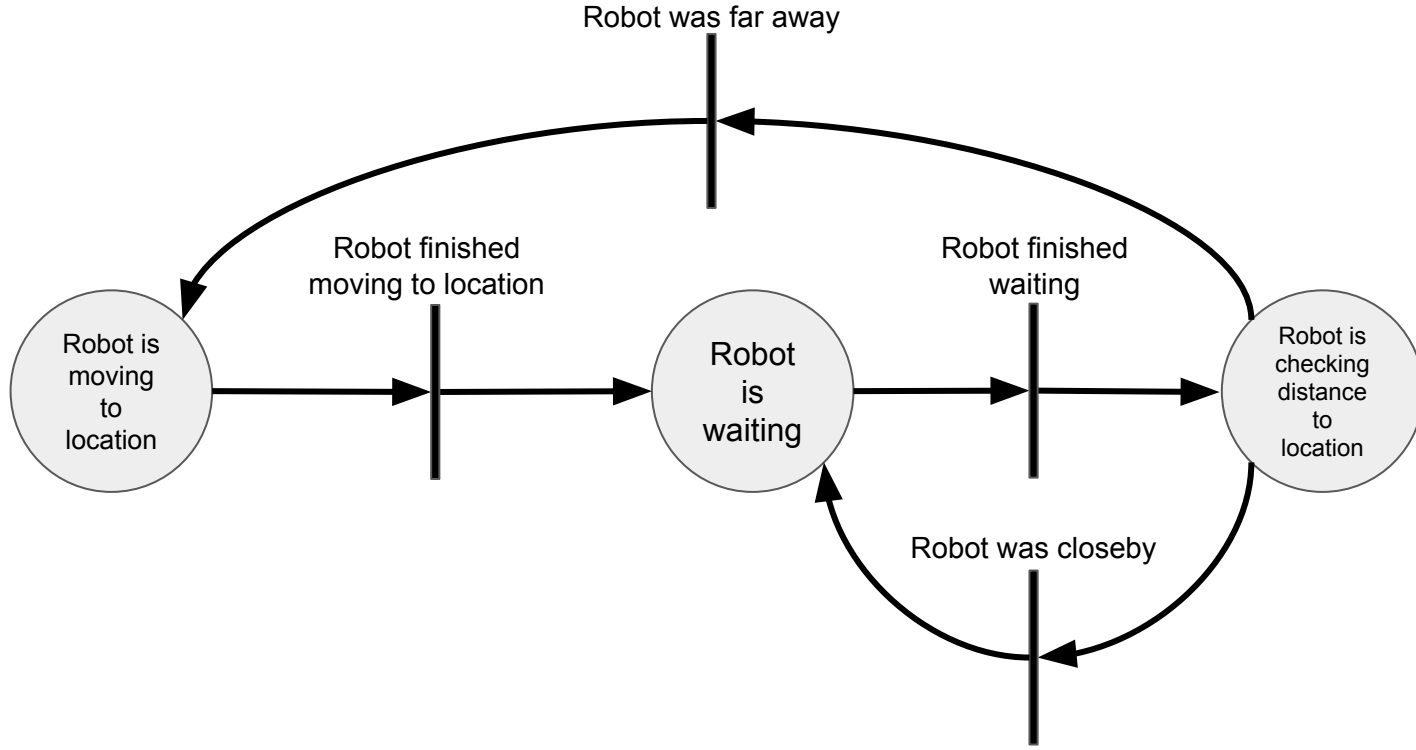
Quiz 2-3: Identify the in edges



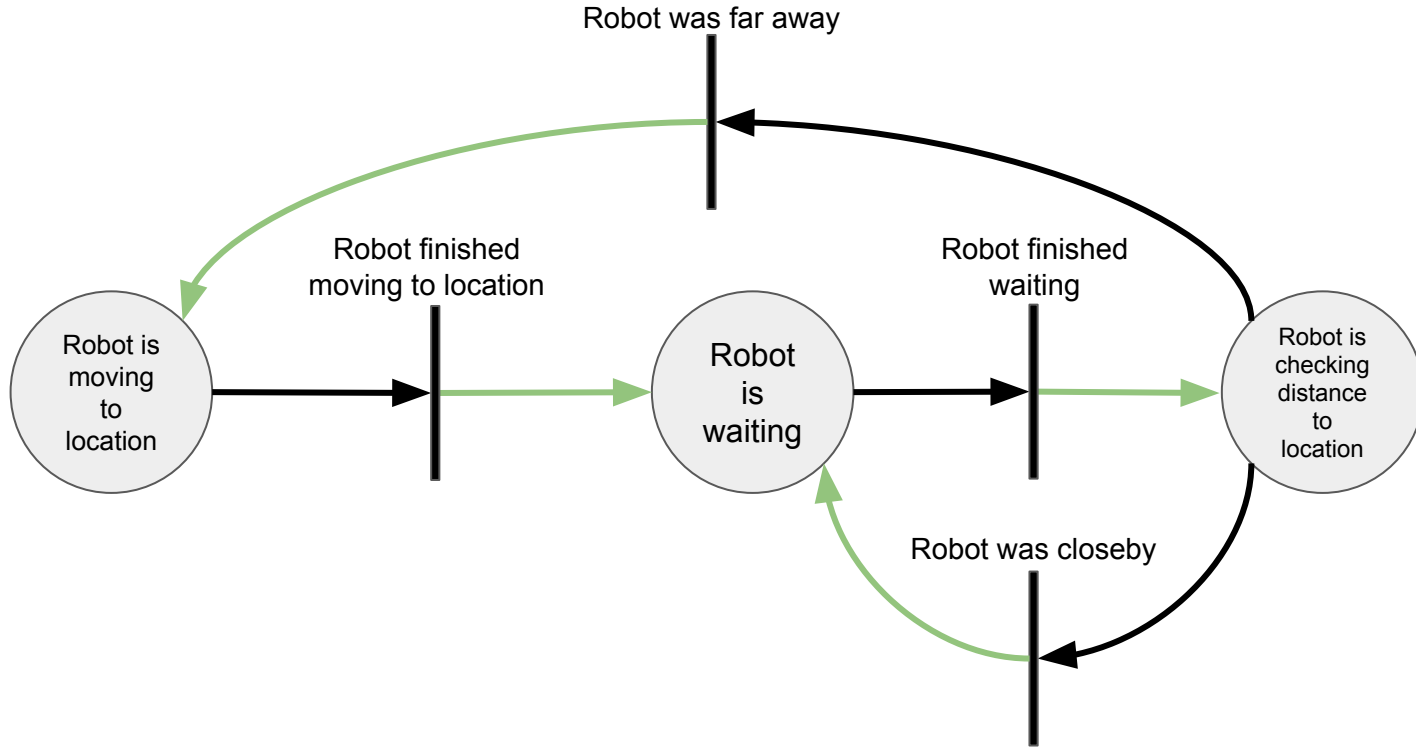
Quiz 2-3 Solution



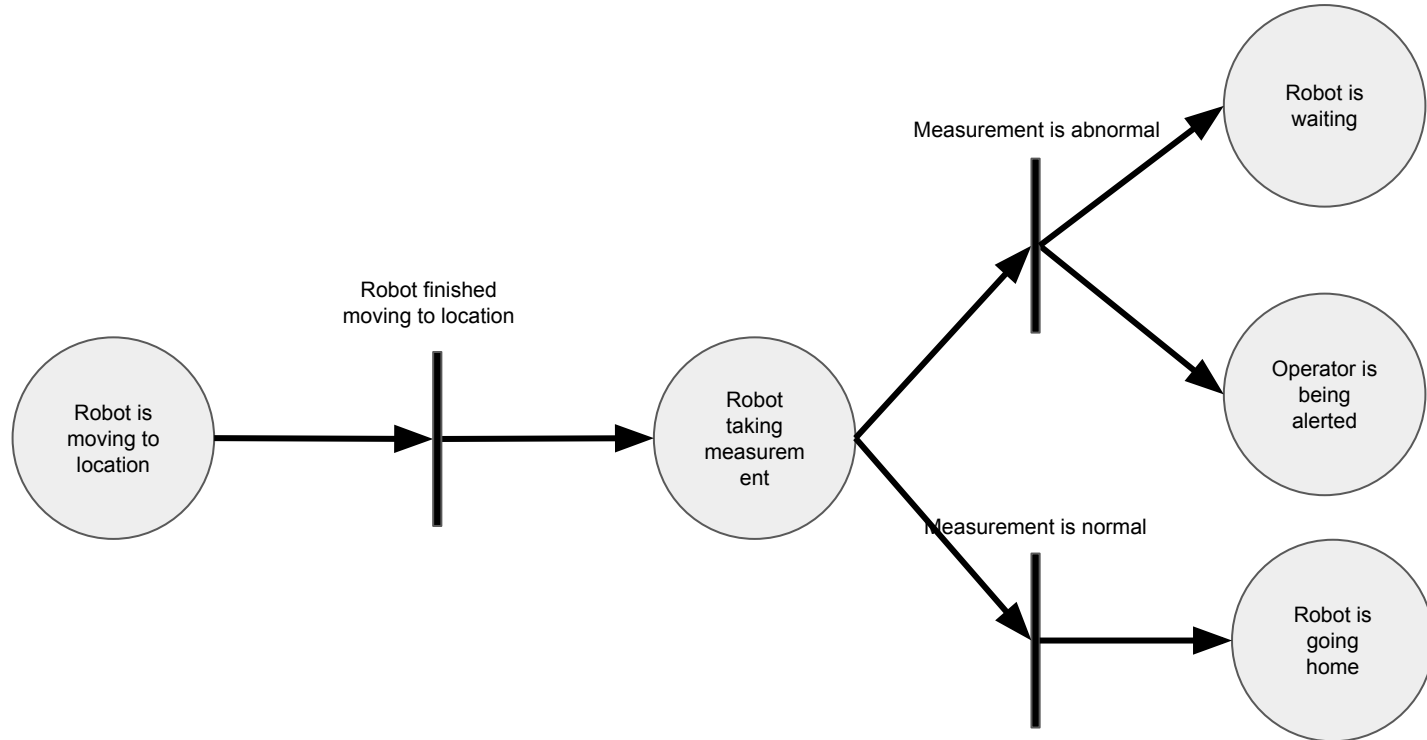
Quiz 2-4: Identify the out edges



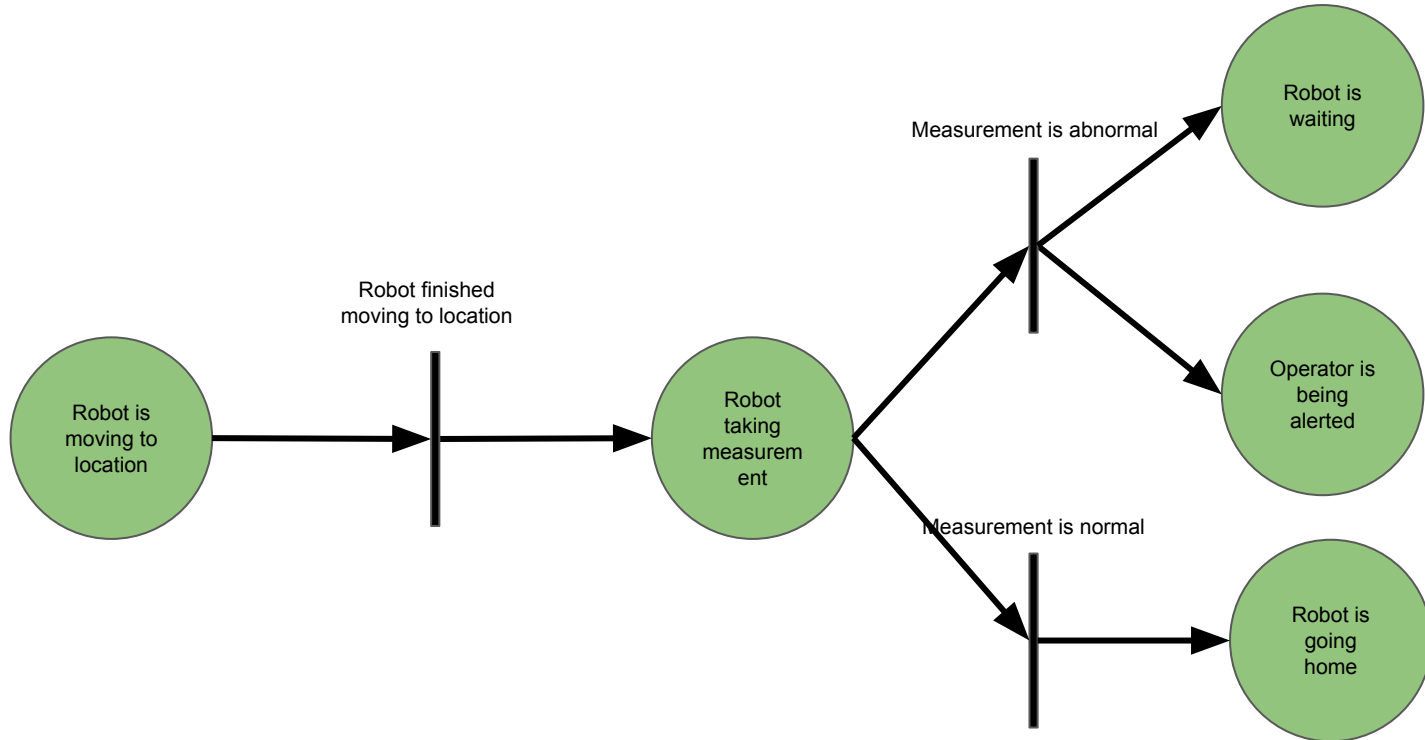
Quiz 2-4 Solution



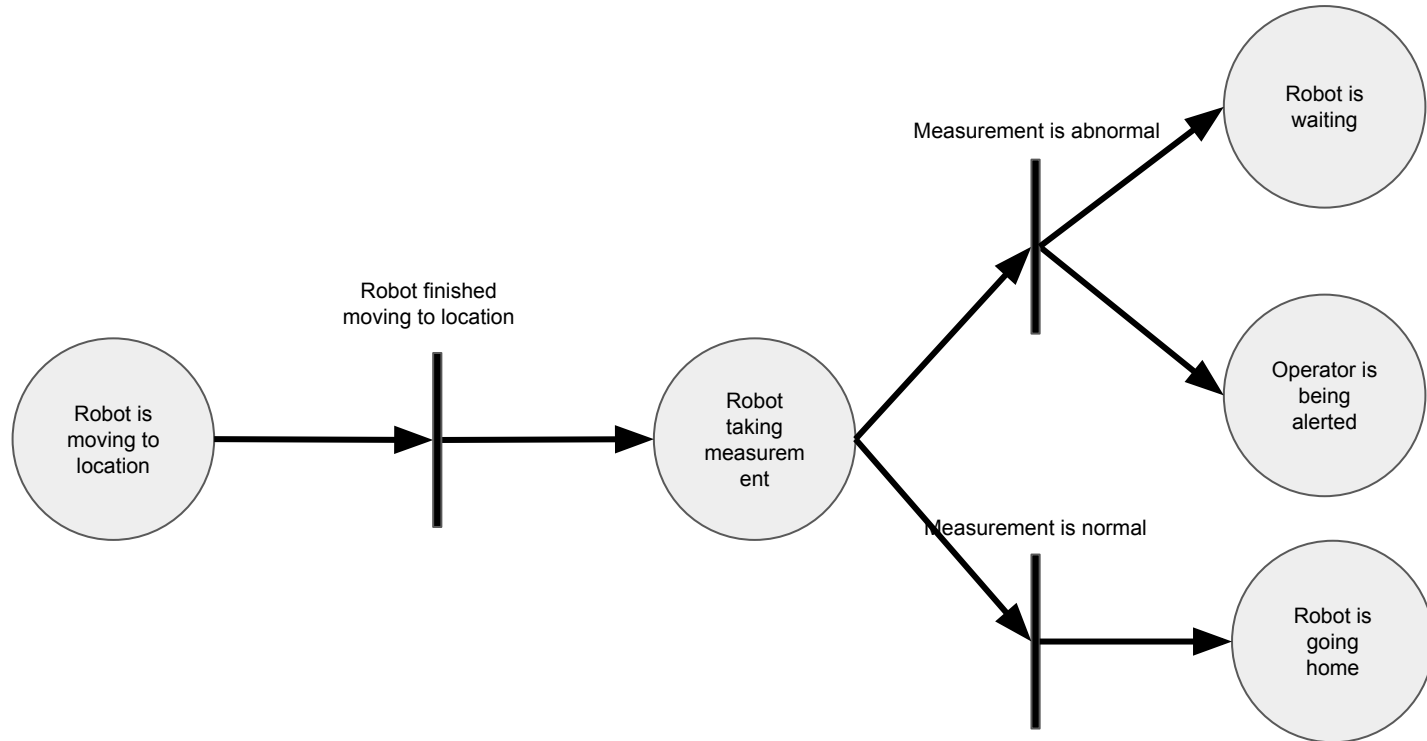
Quiz 2-5: Identify the places



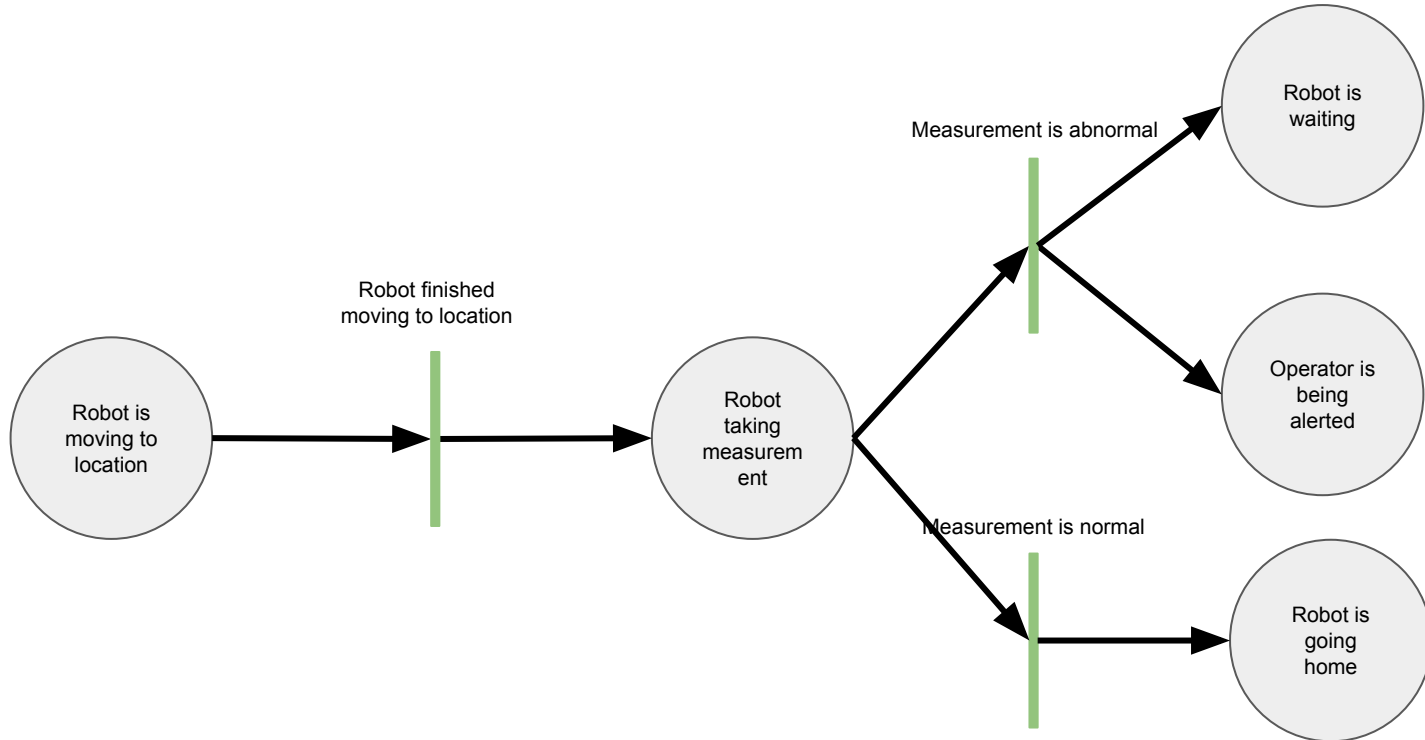
Q2-5 Solution



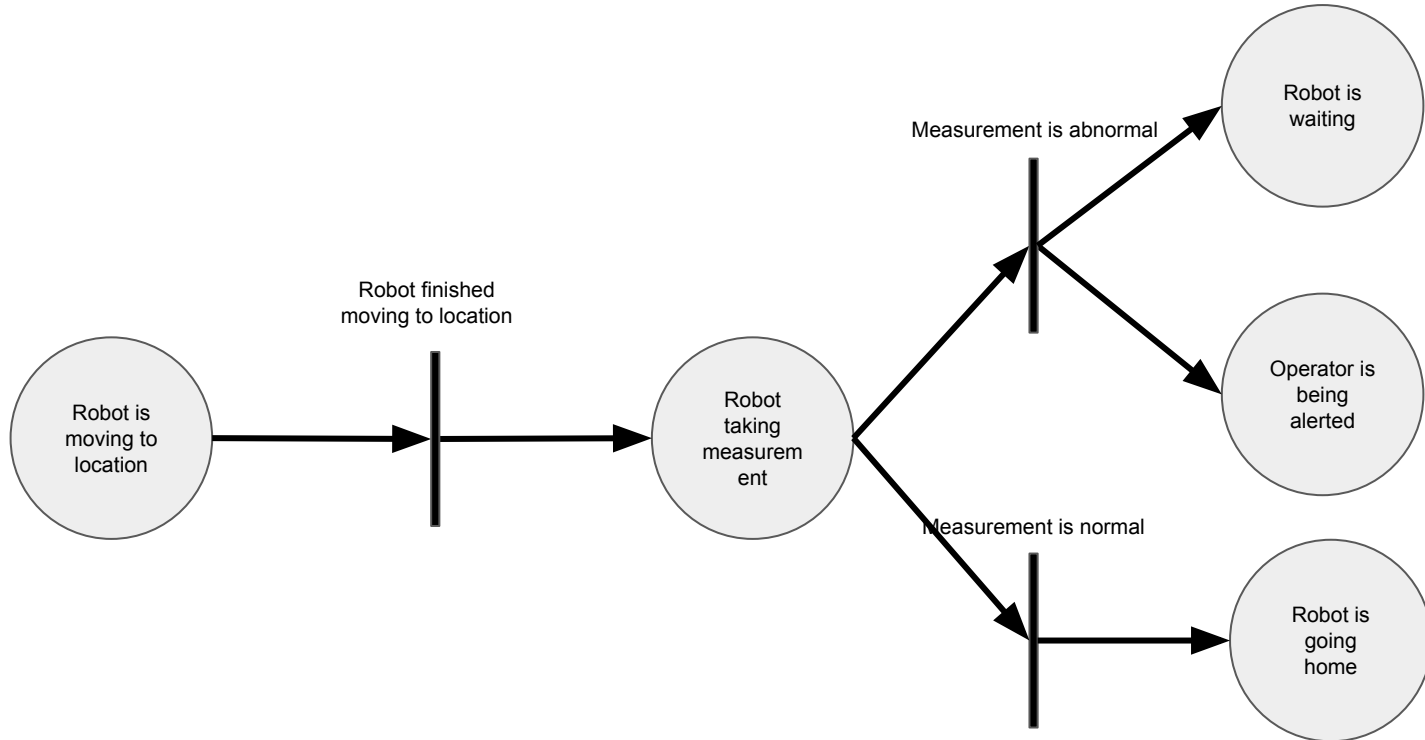
Quiz 2-6: Identify the transitions



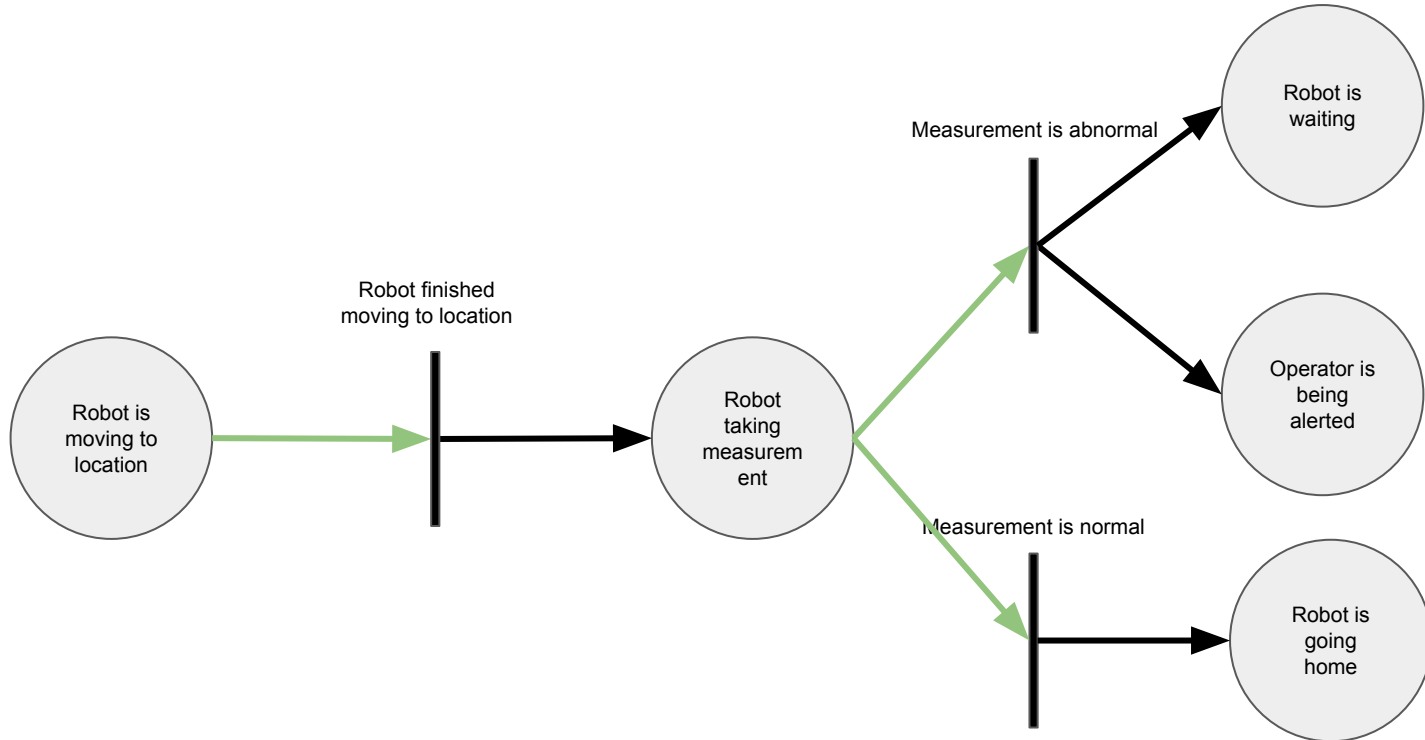
Quiz 2-6 Solution



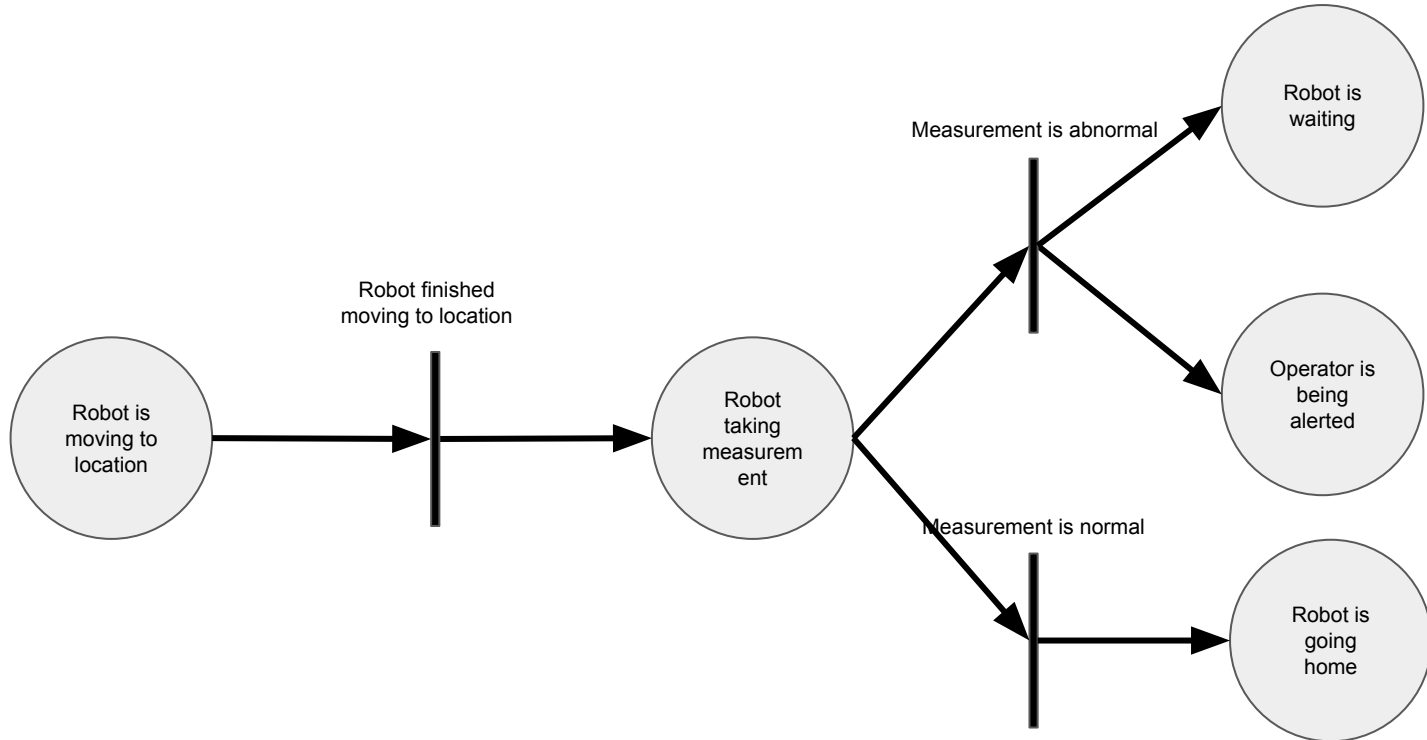
Quiz 2-7: Identify the in edges



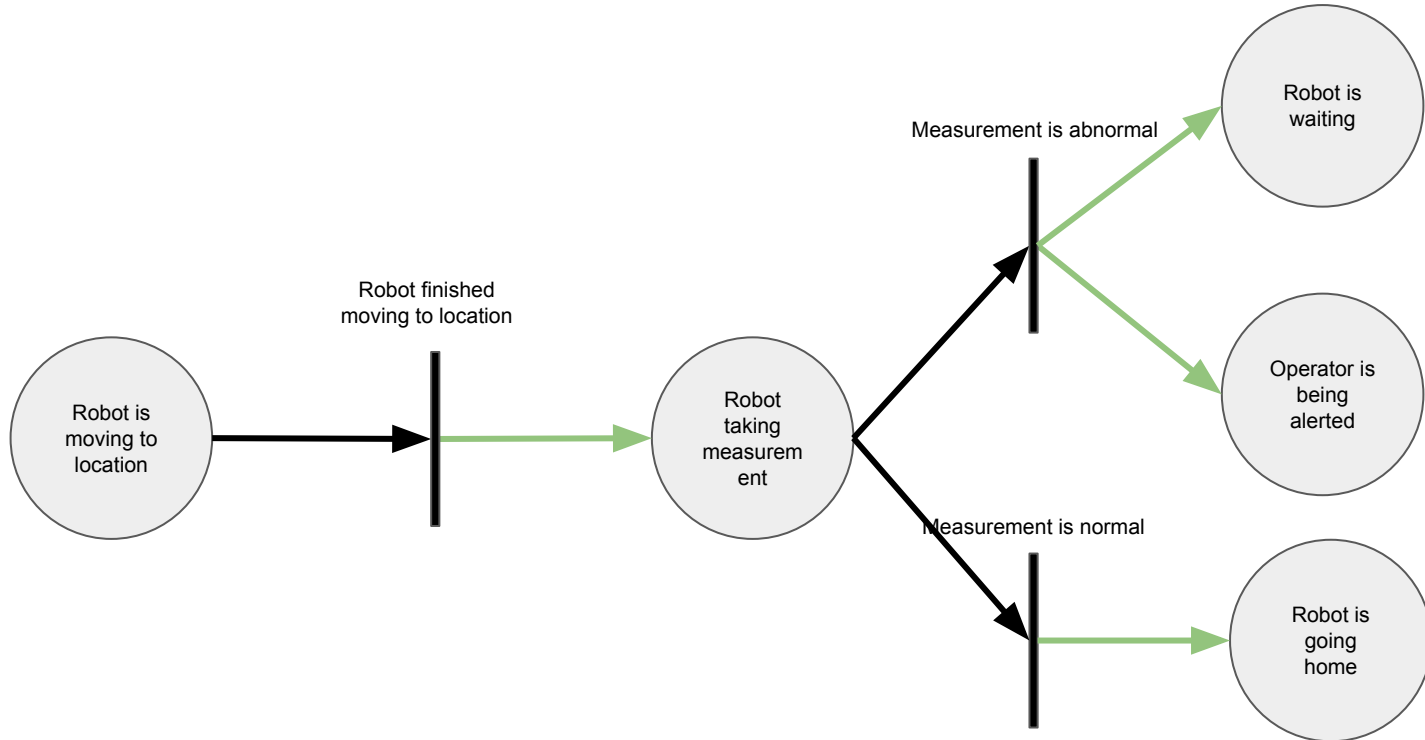
Quiz 2-7 Solution

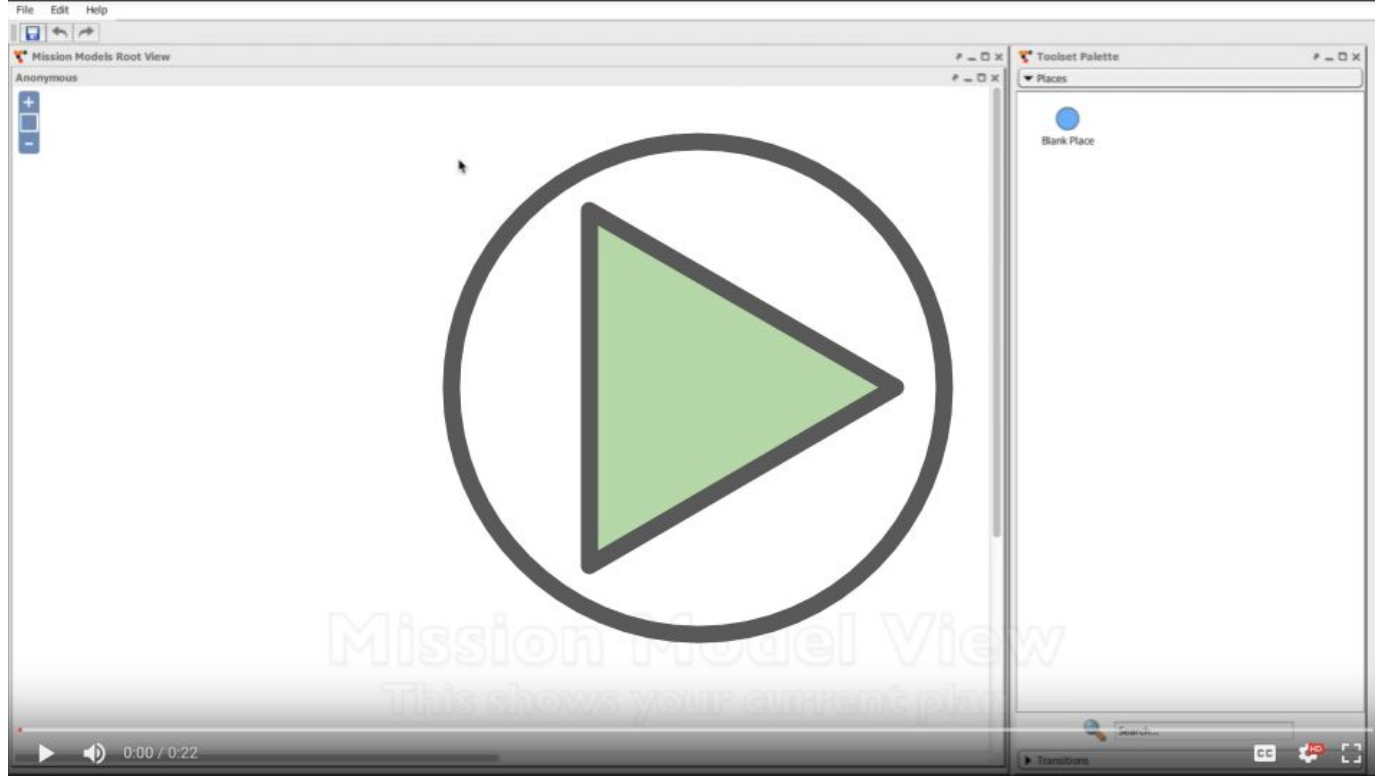


Quiz 2-8: Identify the out edges

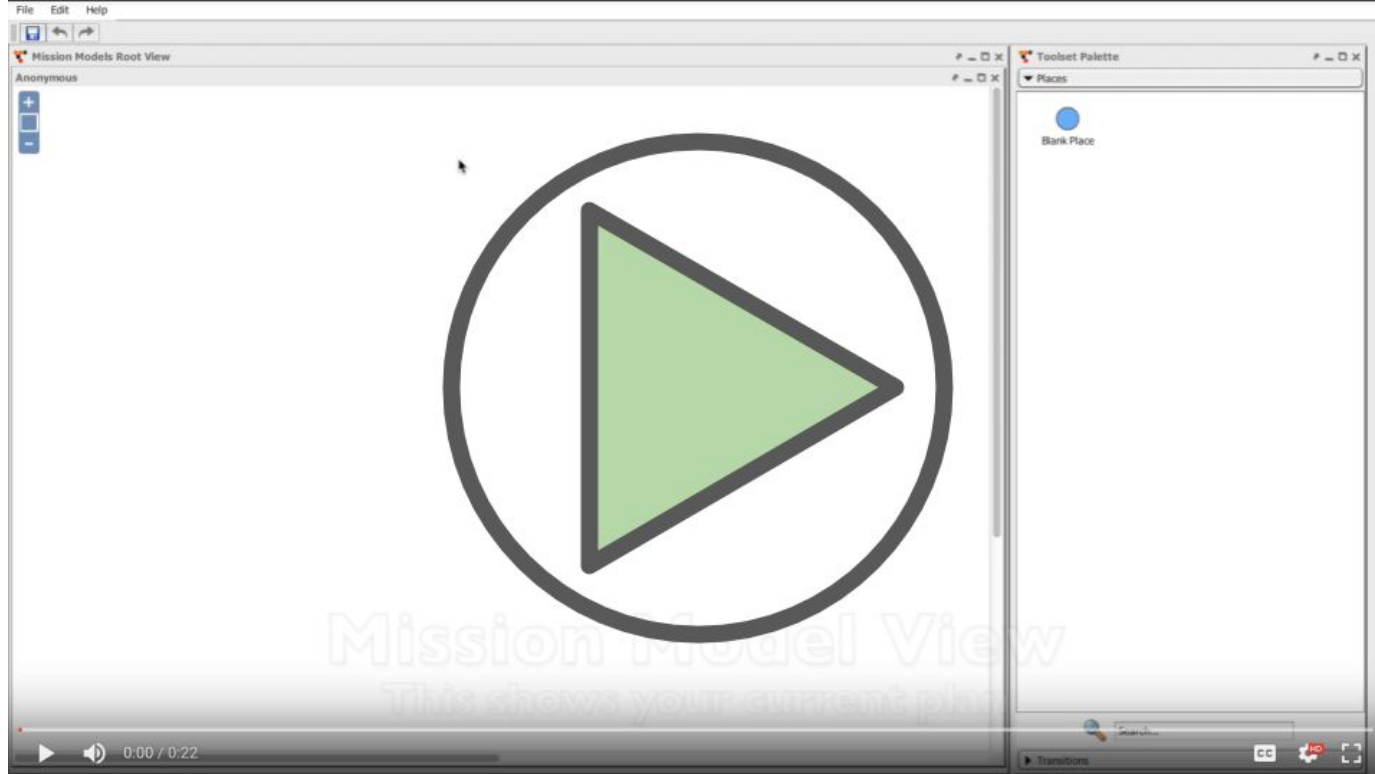


Quiz 2-8 Solution

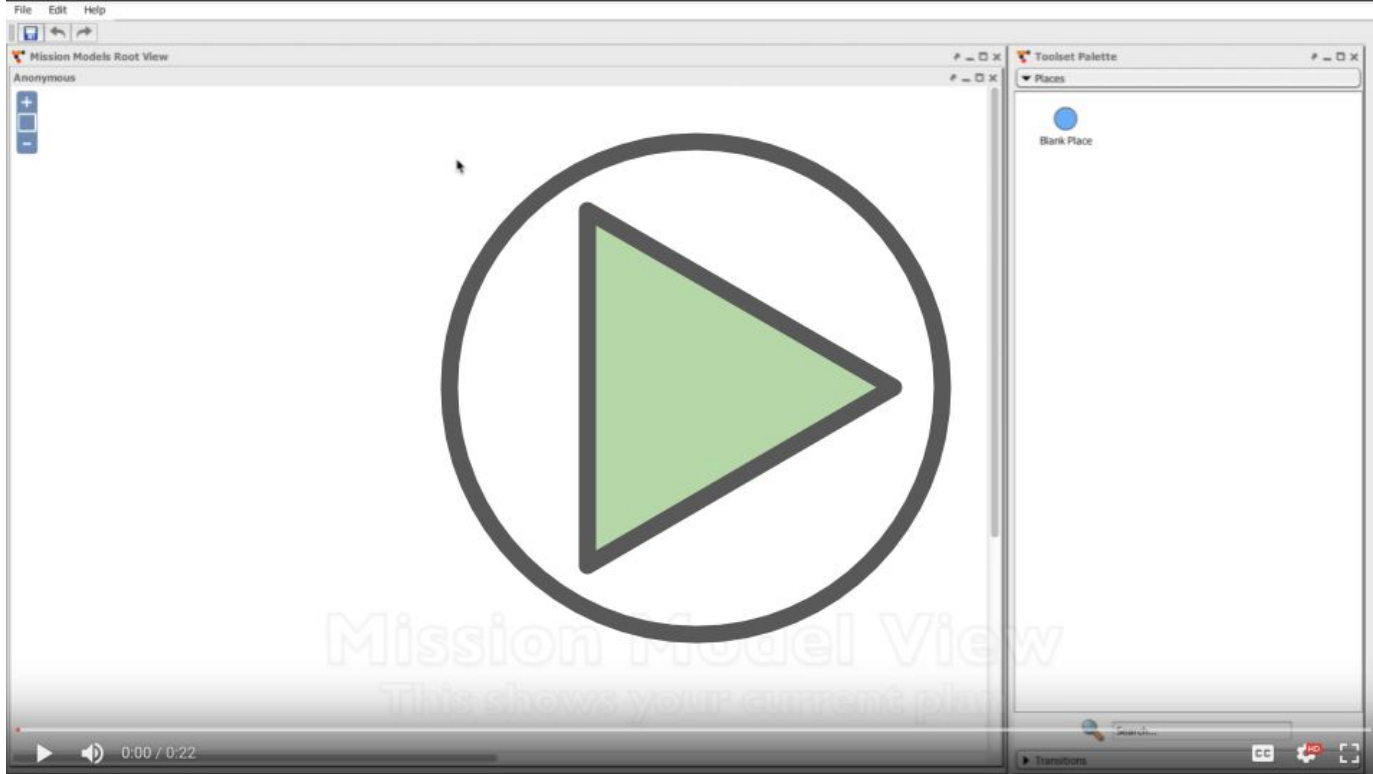




Watch “UI Overview”: This video gives you an overview of DREAMM: the program you will use to develop SPN team plans.



Watch “Places, Transitions, and Edges”: This video will show you how to add and manipulate places, transitions, and edges to a SPN.

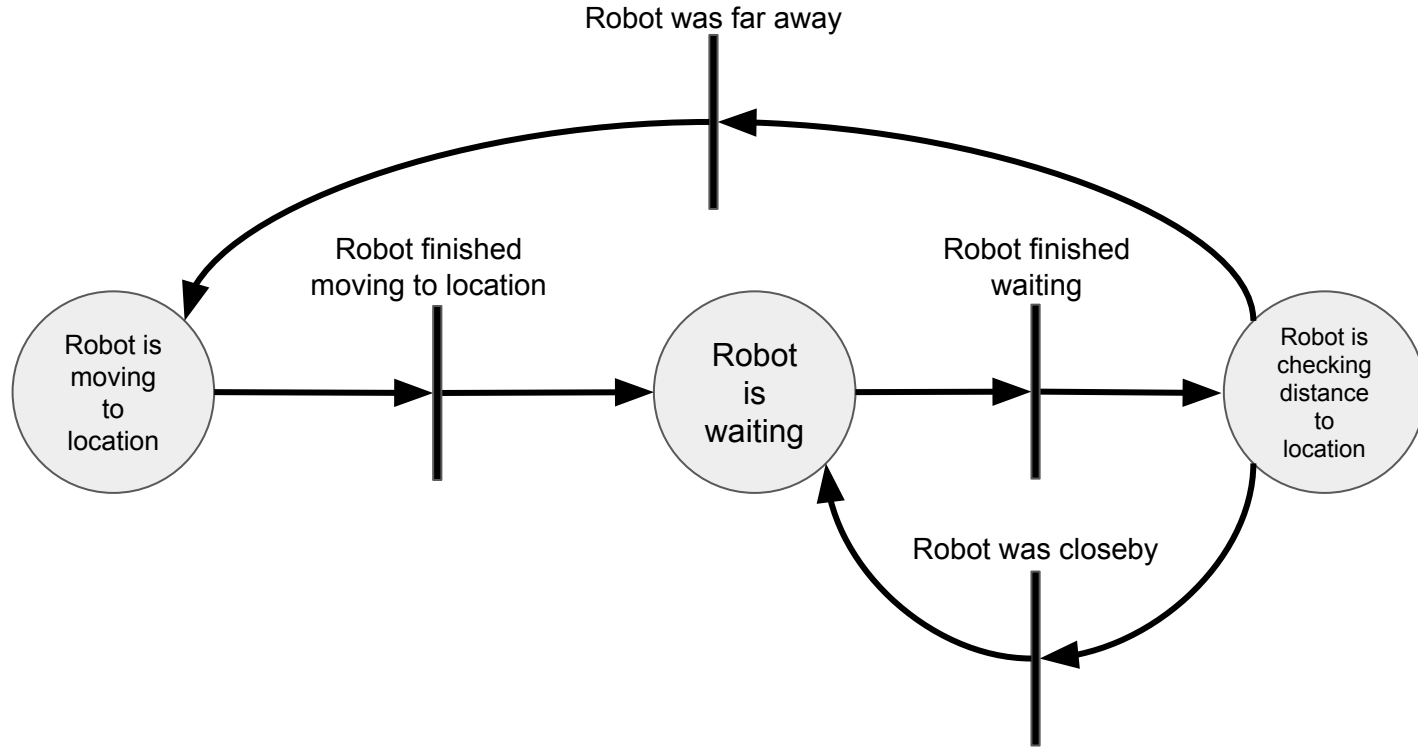


Watch “Multiple SPNs”: This video will show you how to switch between different SPNs.

Now you will practice creating some SPNs in DREAMM from figures like you've seen in this lesson. When constructing these, use the text on the place/transition in the figure as the label for the place/transition in DREAMM.

Job 2-1: Create this SPN in DREAMM

Name the SPN job2-1



Job 2-2: Create this SPN in DREAMM

Name the SPN job2-2

