

These series of lessons were created in collaboration with the teachers from

### Unit Overview

Artificial intelligence and the Internet of Things (IoT) is an integral part of how we utilise technology. Students will be introduced to artificial intelligence (AI) and investigate this technology and how it has been used in websites to create chatbots. They will evaluate the effectiveness of chatbot functions on common websites and use these experiences to design a chatbot function for the school website. In order to ensure the chatbot meets the specific needs of the school community, stakeholders will be identified and surveyed. Students will use this data to and ensure their design meets the needs of different users (parents, teachers, students and wider community). After designing their chatbot students will be immersed in a plethora of activities to build their general-purpose programming language skills. They will utilise these skills to create a digital prototype of their chatbot.

### Session

'Session' has been used to define the order of tasks to complete the unit. It does not define a set time required to complete the task. Time allocated to complete a session is the teacher's discretion. This allows for flexibility for the teacher to drive the duration of the task and make modifications if necessary. Sessions can be merged into one set period or one session may run over multiple periods.

### Australian Curriculum Alignment

The following sessions have been created using the Australian Curriculum: Digital Technologies Curriculum. Tasks may need to be modified to ensure state Digital Technologies Curriculum content descriptions and achievement standards are met. ACS has support and documents to help align this unit to other Digital Technology Curricular.

### Key Preparation

#### General Purpose Programming Language – Python

The skills and resources that are included in this unit specifically focus on Python. If Python is not a language that is used as a programming modification to the resources will be needed.

#### ACS Resources

Resources have been created to help teachers and students unpack and understand topics found within the Digital Technologies Curriculum. These give brief explanations of the topic and the expectations to teach the topic at the curriculum year level. It is intended the information is presented in a way that will set the foundation for further research.

### Key Understandings

Students will:

- Investigate and define artificial intelligence
- Examined the
- Survey stakeholders to gather data to inform the flow and user experience of a chatbot

### Key Questions

- What is artificial intelligence? How is it used today?
- What are the benefits of designing and implementing a chatbot into the school website?
- Who are the stakeholders and how do we ensure their experience using a chatbot is positive?
- What is the flow of your chatbot?
- What skills do you need to learn in programming to create your chatbot?
- How would your chatbot help and support the school community?

### Key Vocabulary

iterative collaborative approach, qualitative data, quantitative data, visual data, functional, non-functional requirements, stakeholders, user experience, functionality, accessibility, usability, aesthetics, digital solutions, future risks, sustainability, innovation, , general purpose programming, flowcharts, diagrams, algorithms, data structures, object orientated programming language, digital solutions, future risks, sustainability, innovation,

Session Number	Session Topic Focus	Learning Intention and Success Criteria	Introduction/Teacher Instruction	Whole Class Activity
1.	Iterative approach	<p><b>Learning Intention</b> Students will identify how projects are completed comparing waterfall to agile method.</p> <p><b>Success Criteria</b> I can explain the processes and roles to complete a project and ADAPT those roles and responsibilities over the course of the project.</p>	Create with the students as a whole class, a diagram that shows the flow of a project. Discuss the positive and negatives of the method and where improvements would need to be made.	Introduce students to the project and discuss the different roles they will undertake during the project. Students look at how the roles will impact how the project timelines and meeting deadlines effect the final product.
<b>Session Resources</b>	<b>Student Resource</b>		<b>Teacher Resource</b>	
	<ul style="list-style-type: none"> <li></li> </ul>		<ul style="list-style-type: none"> <li>ACS Teacher Resource: Iterative Approach</li> </ul>	
2.	Artificial intelligence	<p><b>Learning Intention</b> Students will define artificial intelligence and explain the how AI is utilised in technology.</p> <p><b>Success Criteria</b> I can define artificial intelligence and explain how artificial intelligence is being utilised in technology.</p>	Define what artificial intelligence as a class and identify when students have encountered artificial intelligence in their lives when interacting with technology	Students work through information about artificial intelligence (AI). In small groups they create a definition of artificial intelligence, create a list of pros and cons and examples of AI technologies that are used by the students on regular basis.
<b>Session Resources</b>	<b>Student Resources</b>		<b>Teacher Resources</b>	
	<ul style="list-style-type: none"> <li>Information to explain AI (not provided)</li> </ul>		<ul style="list-style-type: none"> <li></li> </ul>	

Session Number	Session Topic Focus	Learning Intention and Success Criteria	Introduction/Teacher Instruction	Whole Class Activity
3.	Introduction to Chatbots	<p><b>Learning Intention</b> Students will experiment with and evaluate chatbot technology found in common websites.</p> <p><b>Success Criteria</b> I can evaluate chatbot technology and evaluate the effectiveness when used on different platforms.</p>	<p>Discuss with the benefits of creating and programming a chatbot. Discussing the benefits for the business and for the customers/stakeholders.</p> <p>Open up website that has a chatbot function and as a class discuss the experience.</p>	<p>Students visit a selection of websites and evaluate the effectiveness of the chat based on evaluation questions and rate the effectiveness of the chatbot.</p> <p>Compare a website that does and does not have chatbot function on it. To get a feel for the user experience of comparing two websites offering the same product with and with out the chatbot</p>
<b>Session Resources</b>	<p><b>Student Resources</b></p> <ul style="list-style-type: none"> <li>• <a href="https://marutitech.medium.com/how-to-order-food-conveniently-through-chatbot">https://marutitech.medium.com/how-to-order-food-conveniently-through-chatbot</a></li> <li>• <a href="https://www.youtube.com/watch?v=mp30vummNxY">https://www.youtube.com/watch?v=mp30vummNxY</a></li> <li>• <a href="https://www.qsrmagazine.com/outside-insights/chatbots-restaurants-redefining-customer-experience">https://www.qsrmagazine.com/outside-insights/chatbots-restaurants-redefining-customer-experience</a></li> </ul>		<p><b>Teacher Resources</b></p> <ul style="list-style-type: none"> <li>• ACS Chatbot Examples (see key preparation)</li> <li>• Evaluation of the Chatbots</li> <li>• <a href="https://www.freecodecamp.org/news/how-to-build-a-chatbot-with-react/">https://www.freecodecamp.org/news/how-to-build-a-chatbot-with-react/</a></li> <li>• <a href="https://www.youtube.com/watch?v=uiZVmRmybjo">https://www.youtube.com/watch?v=uiZVmRmybjo</a></li> <li>• <a href="https://www.smpertth.com/resources/chatbots/">https://www.smpertth.com/resources/chatbots/</a></li> <li>• <a href="https://www.theiconic.com.au/">https://www.theiconic.com.au/</a></li> <li>• <a href="https://www.pandorabots.com">https://www.pandorabots.com</a></li> </ul>	

Session Number	Session Topic Focus	Learning Intention and Success Criteria	Introduction/Teacher Instruction	Whole Class Activity
4.	Acquiring stakeholder data	<p><b>Learning Intention</b> Students will create a survey to ensure their design is solving the right problem for their stakeholders. Structure of the survey will include quantitative and qualitative questions.</p> <p><b>Success Criteria</b> I can generate a survey that contains qualitative and quantitative questions for my stakeholders.</p>	<p>Students discuss how they can incorporate a chatbot into the school website and how this will be beneficial for the school, admin staff, parents and wider community.</p> <p>Identify and create profiles of stakeholders of people that will visit the website.</p>	<p>Using the stakeholder profiles, students create surveys that will target different audiences. They will create a list of questions to include numerical data (quantitative) and worded data (qualitative data)</p> <p>Students will then interview the stakeholders. They will collect and analyse the data. From this, students will identify and share 'must have' functions. This will help develop the design of the chatbot.</p>
<b>Session Resources</b>	<p><b>Student resources</b></p> <ul style="list-style-type: none"> <li>• Examples of questions to ask</li> <li>• Stakeholder Profile</li> </ul>		<p><b>Teacher Resources</b></p> <ul style="list-style-type: none"> <li>• ACS Teacher Resource: Real World Problems</li> </ul>	

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5.	User Experience	<p><b>Learning Intention</b> Students will factor in the user experience to design a chatbot function specific to the users' needs.</p> <p><b>Success Criteria</b> I can create a chatbot that meets the specific needs of the users to ensure they have a positive experience when using the chatbot.</p>	<p>Introduce students to chat bot and look at how they operate. Look and feel of 'talking to someone'.</p> <p>Discuss the stakeholder input and discuss how are the people that will visit the site and discuss the identified 'must have functions'</p>	<p>Using the evaluation of chatbot technology (completed in session 3) and the stakeholder data, students design the must have pages for the different stakeholders.</p> <p>Students will design a selection of pages for the different stakeholders. This may include: the initial menu is for parents, students, teachers and wider community. They will identify the similarities and differences to show how each stakeholder has been considered to ensure a positive user experience.</p>
<b>Session Resources</b>	<p><b>Student Resources</b></p> <ul style="list-style-type: none"> <li>• Chabot Storyboard</li> <li>• Chatbot Storyboard</li> </ul>		<p><b>Teacher Resources</b></p> <ul style="list-style-type: none"> <li>• ACS Teacher Resource: User Experience</li> </ul>	

Session Number	Session Topic Focus	Learning Intention and Success Criteria	Introduction/Teacher Instruction	Whole Class Activity
6.	Creating a flowchart	<p><b>Learning Intention</b> Students will create a flowchart of the chatbot to show the flow and structure of their chatbot. They will use the flowchart to test their validity of their code and flow to reduce the risk of</p> <p><b>Success Criteria</b> I can create a flowchart that will</p>	<p>As a whole class, review a flowchart created for a chatbot. Take students through the flowchart, discussing any possible errors and/or the need to have more properties added to the flowchart.</p> <p>Discuss how students can adapt already made flowcharts to help them build a flowchart for their chatbots.</p>	<p>Students analyse a flowchart that has already been created. They test the flowchart by looking for possible errors or areas that may have been left out.</p> <p>Taking the stakeholder data and the user experience design. They create a selection of must have questions and possible answers.</p> <p>Using their experience of testing a flowchart and the information gathered regarding their stake holders, students create a flowchart for the school chatbot.</p> <p>Once the flowcharts are completed, students test their flowcharts to look for possible errors and issues that may occur when coding.</p>
<b>Session Resources</b>	<p><b>Student Resources</b></p> <ul style="list-style-type: none"> <li>• Examples of flowchart for Chatbots</li> </ul>		<p><b>Teacher Resources</b></p> <ul style="list-style-type: none"> <li>• ACS Teacher Resource: Algorithms</li> </ul>	

Session Number	Session Topic Focus	Learning Intention and Success Criteria	Introduction/Teacher Instruction	Whole Class Activity
7.	Introduction to programming platform	<p><b>Learning Intention</b> Students will learn the basic functions to program using Python.</p> <p><b>Success Criteria</b> I can complete a range of activities to help me develop my skills as a Python programmer</p>	Introduce students to the programming platform they will be using to create the school website chatbot. Provide students some time to familiarise themselves with the	Students are provided with a range of activities to help them develop their programming skills within Python. In small groups, students work through these activities. These activities will help them develop the necessary skills to program their chatbot.
<b>Session Resources</b>	<p><b>Student Resources</b></p> <ul style="list-style-type: none"> <li></li> </ul>		<p><b>Teacher Resources</b></p> <ul style="list-style-type: none"> <li>• ACS Teacher Resource: Algorithms</li> <li>• <a href="https://www.python.org/">https://www.python.org/</a></li> <li>• <a href="http://tdc-www.harvard.edu/Python.pdf">http://tdc-www.harvard.edu/Python.pdf</a></li> <li>• <a href="https://static.realpython.com/python-basics-sample-chapters.pdf">https://static.realpython.com/python-basics-sample-chapters.pdf</a></li> <li>• <a href="https://wiki.python.org/moin/BeginnersGuide">https://wiki.python.org/moin/BeginnersGuide</a></li> </ul>	
8.	Creating a prototype of the chatbot	<p><b>Learning Intention</b> Students will create a digital prototype of their chatbot using the storyboard and flowchart to support their development.</p> <p><b>Success Criteria</b> I can create a digital prototype of my chatbot using the design storyboard and flowchart.</p>	<p>Provide students with a quick walk through of the platform to create a chatbot in.</p> <p>Ensure students have the necessary designs and information to complete the programming to create their chatbot.</p>	Students analyse code that has already been used to create a chatbot by previous users. They analyse the code, look for possible errors and use the code to help them develop their own chatbot program.
<b>Session Resources</b>	<p><b>Student Resources</b></p> <ul style="list-style-type: none"> <li>• Examples of code for the Chatbot</li> </ul>		<p><b>Teacher Resource</b></p>	



Session Number	Session Topic Focus	Learning Intention and Success Criteria	Introduction/Teacher Instruction	Whole Class Activity
9.	Evaluating student digital solution	<p><b>Learning Intention</b> Students will present their chatbot and evaluate their designs and prototype by answering a set of questions and prompts.</p> <p><b>Success Criteria</b> I can evaluate my chatbot by answering a set of questions and prompts.</p>	Students share their chatbots with their peers, providing them the opportunity to complete a run through of their program.	<p>Students will evaluate their solution based on a set of questions and prompts.</p> <p>Students complete the evaluations individually and share their evaluations with their peers.</p>
<b>Session Resources</b>	<ul style="list-style-type: none"> <li>Chatbot Design Evaluation Questions and Prompts</li> </ul>			

Chatbot Evaluation Questions	
Theme	Question/ Discussion Prompts
<b>Introduction</b>	<p>Name of the website</p> <p>Product for the website and purpose of the chatbot</p> <p>First message that appears</p>
<b>Functionality</b>	Briefly explains for the chatbot operates. What are the functional requirement, the must haves to have a successful chatbot operating?
<b>User Experience</b>	<p>Describe the colours that are used and the appearance</p> <p>What is your opinion of the colours, graphics and style of the chatbot?</p> <p>Did it feel like you were actually talking to someone? Or did you get the sense of it being limited?</p> <p>Did you have an issues with the chatbot?</p> <p>Any bad user experience that you can take away from this?</p> <p>What about positive experiences?</p> <p>What about the font that was used? Was that easy to read?</p>
<b>Data collection</b>	<p>Do you need to add your details in? What do you think of this feature? (Remembering that the company has now collected some personal data.)</p> <p>What happens to the data that is taken from the user?</p> <p>Look on their website – do they have any privacy information about where the chatbot data is stored?</p>
<b>Usability and aesthetics</b>	<p>Are there any errors or glitches when using the chatbot?</p> <p>Was your experience a positive one?</p> <p>Did anything seem out of place or unnecessary?</p>
<b>Final opinion</b>	<p>Rate your experience out of 10. Explain your answer.</p> <p>Do you think that a chatbot function is necessary on this webpage? Why/Why not?</p> <p>Would you use a chatbot over searching the website</p>

### Examples of Questions to ask stakeholders

Stakeholder: Parent			
Question	Style/example of question	Data collected	Purpose of the question
What parts of the website do you visits the most	Multiple choice options – can tick multiple boxes E.g. <ul style="list-style-type: none"> <li>• Home page</li> <li>• Curriculum</li> <li>• Inquires</li> <li>• Contact us</li> </ul>	Quantitative	To find out the areas of the website that are visited the most
How often do you visit the website	Multiple options such as: 1 – 3 times a week Daily Once a month	Quantitative	To find out how often parents ae using our website.
When communicating with the office what information are looking for?	Open ended word question	Qualitative	To find the purpose of calling the office and use that to make as a part of the decision tree.

Stakeholder Profile	
Stake holder group	
Short bio/ summary of the stakeholder group	
Parts of the website the user frequently visits	
Words or phrases the user will be looking for	
Decisions and input the user will require	
Reasons why the stakeholder will use the chatbot	

### Chatbot Design and Prototype Evaluation

Questions	Evaluation
<p>How successful were you building your digital prototype?</p> <p>How does your design solve a problem?</p> <p>How could it meet the needs of others?</p> <p>If you were to create another design, what would you do differently?</p> <p>Where there any design features that you liked from the other technologies and companies you evaluated? How could you adapt those to add to your app?</p> <p>What challenged you? How did you overcome those challenges?</p> <p>What excited you? What didn't work out for you? If you had the option to create any app – what would you create?</p> <p>How does this design meet the needs of the user?</p> <p>Are there any limitations when using the chatbot?</p> <p>What makes this design innovative?</p> <p>What type of risks or potential risks could occur?</p>	

## Chatbot Decision Tree and Flowchart Example

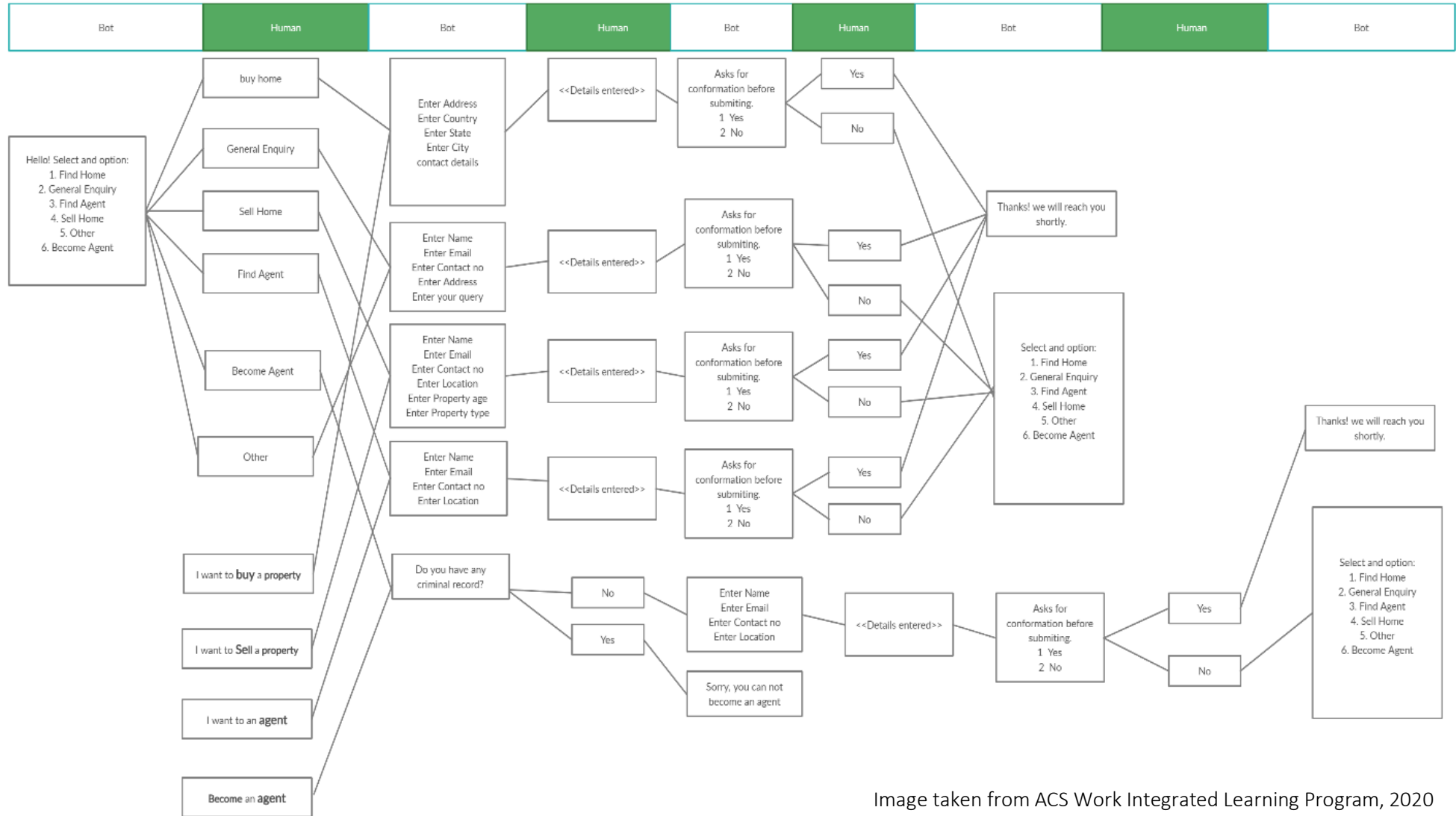


Image taken from ACS Work Integrated Learning Program, 2020

## Chatbot Decision Tree and Flowchart Examp

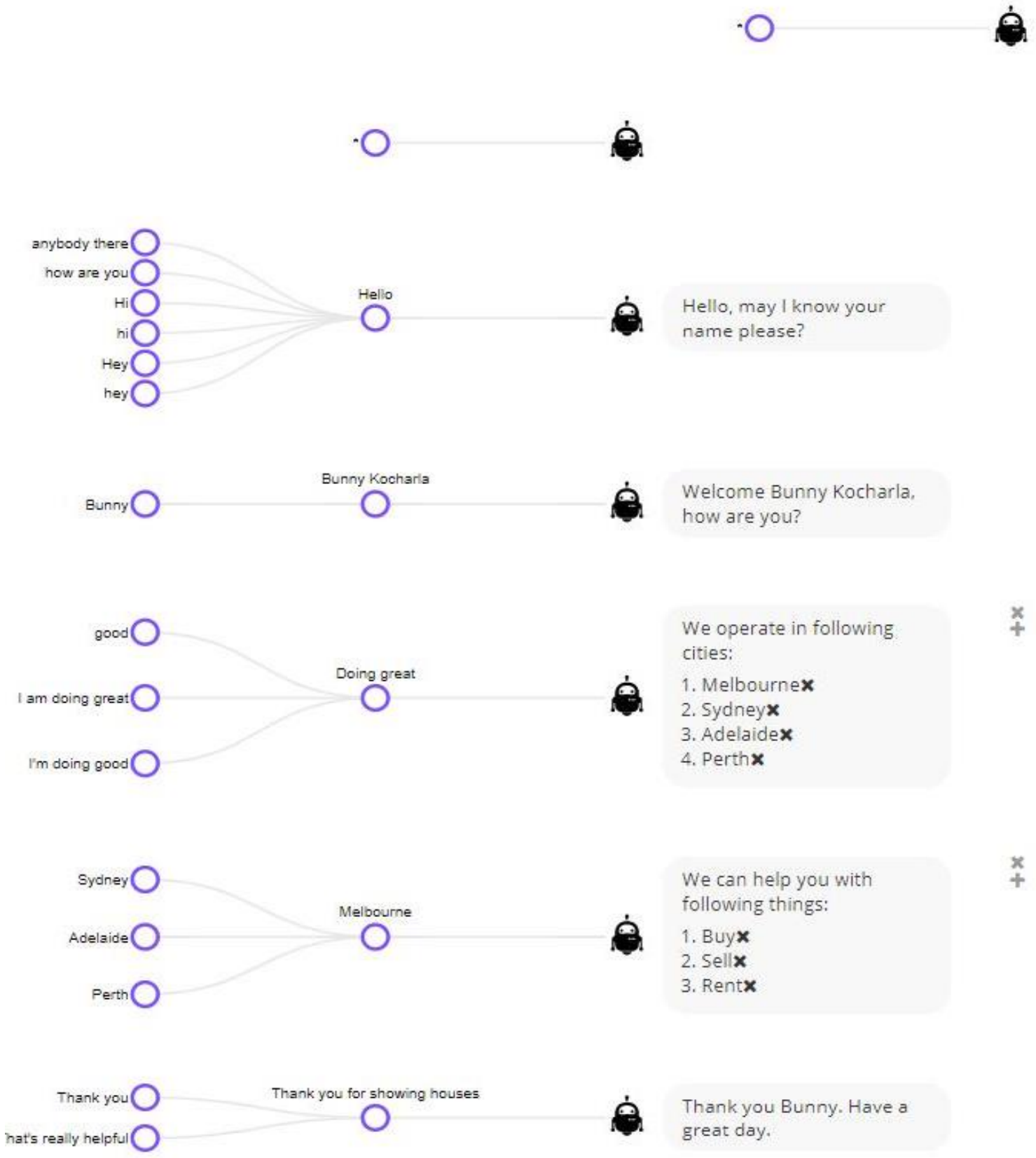


Image taken from ACS Work Integrated Learning Program, 2020

```

1 import React from 'react'
2 import { Row, Col, Container, Dropdown, Button } from 'react-bootstrap'
3 import styled from 'styled-components'
4 import './App.css'
5
6
7 const Styles = styled.div`
8   .btn-primary:not(:disabled):not(.disabled).active:focus, .btn-primary:not(:disabled):not(.disabled):active:focus, .show>.btn-primary.dropdown-toggle:focus {
9     box-shadow: none;
10  }
11  .btn-primary:not(:disabled):not(.disabled).active, .btn-primary:not(:disabled):not(.disabled):active, .show>.btn-primary.dropdown-toggle {
12    color: black;
13    background-color: transparent;
14    border-color: none;
15  }
16  .btn-primary:focus, .btn-primary:active {
17    color: black;
18    background-color: transparent;
19    border-color: transparent;
20    box-shadow: none;
21  }
22  .btn-primary:not(:disabled):not(.disabled).active, .btn-primary:not(:disabled):not(.disabled):active, .show>.btn-primary.dropdown-toggle {
23    color: black;
24    background-color: transparent;
25    border-color: transparent;
26  }
27  .btn-primary:hover {
28    color: black;
29    background-color: none;
30    border-color: transparent;
31  }
32  .btn-primary {
33    color: black;
34    font-size: 28px;
35    background-color: transparent;
36    border-color: transparent;
37  }
38  .btn:hover {
39    color: black;
40    text-decoration: none;
41  }
42  .dropdown-toggle:after {
43    color: #FEB369;
44    margin-left: 58px;
45  }
46 `;
47
48 const Search = () => {
49   return (
50     <Styles>
51       <Container style={{ marginTop: "35px" }}>
52         <Row style={{ backgroundColor: "white" }}>
53           <Col xs={3} style={{ borderRight: "1px solid black" }}>
54             <Label style={{ fontSize: "18px", marginLeft: "15px" }}>Property Type</Label>
55             <Dropdown style={{ marginTop: "-18px" }}>
56               <Dropdown.Toggle id="dropdown-basic">
57                 All
58               </Dropdown.Toggle>
59               <Dropdown.Menu>
60                 <Dropdown.Item href="#/action-1">Buy</Dropdown.Item>
61                 <Dropdown.Item href="#/action-2">Rent</Dropdown.Item>
62                 <Dropdown.Item href="#/action-3">Sell</Dropdown.Item>
63               </Dropdown.Menu>
64             </Col>
65
66             <Col xs={3} style={{ borderRight: "1px solid black" }}>
67               <Label style={{ fontSize: "18px", marginLeft: "15px" }}>Location</Label>
68               <Dropdown style={{ marginTop: "-18px" }}>
69                 <Dropdown.Toggle id="dropdown-basic">
70                   City
71                 </Dropdown.Toggle>
72                 <Dropdown.Menu>
73                   <Dropdown.Item href="#/action-1">Melbourne</Dropdown.Item>
74                   <Dropdown.Item href="#/action-2">Sydney</Dropdown.Item>
75                   <Dropdown.Item href="#/action-3">Adelaide</Dropdown.Item>
76                 </Dropdown.Menu>
77               </Col>
78
79               <Col xs={3}>
80                 <Label style={{ fontSize: "18px", marginLeft: "15px" }}>Price Range</Label>
81                 <Dropdown style={{ marginTop: "-18px" }}>
82                   <Dropdown.Toggle id="dropdown-basic">
83                     200k - 300k
84                   </Dropdown.Toggle>
85                   <Dropdown.Menu>
86                     <Dropdown.Item href="#/action-1">300k - 400k</Dropdown.Item>
87                     <Dropdown.Item href="#/action-2">400k - 500k</Dropdown.Item>
88                     <Dropdown.Item href="#/action-3">500k - 600k</Dropdown.Item>
89                   </Dropdown.Menu>
90                 </Col>
91               <Col xs={3} style={{ verticalAlign: "center", textAlign: "center" }}>
92                 <Button style={{ margin: "0 auto 0 auto", width: "100px", height: "30px", color: "white" }}>SEARCH</Button>
93               </Col>
94             </Row>
95           </Container>
96         </Styles>
97       )
98     }
99
100 export default Search;

```

Image taken from ACS Work Integrated Learning Program, 2020