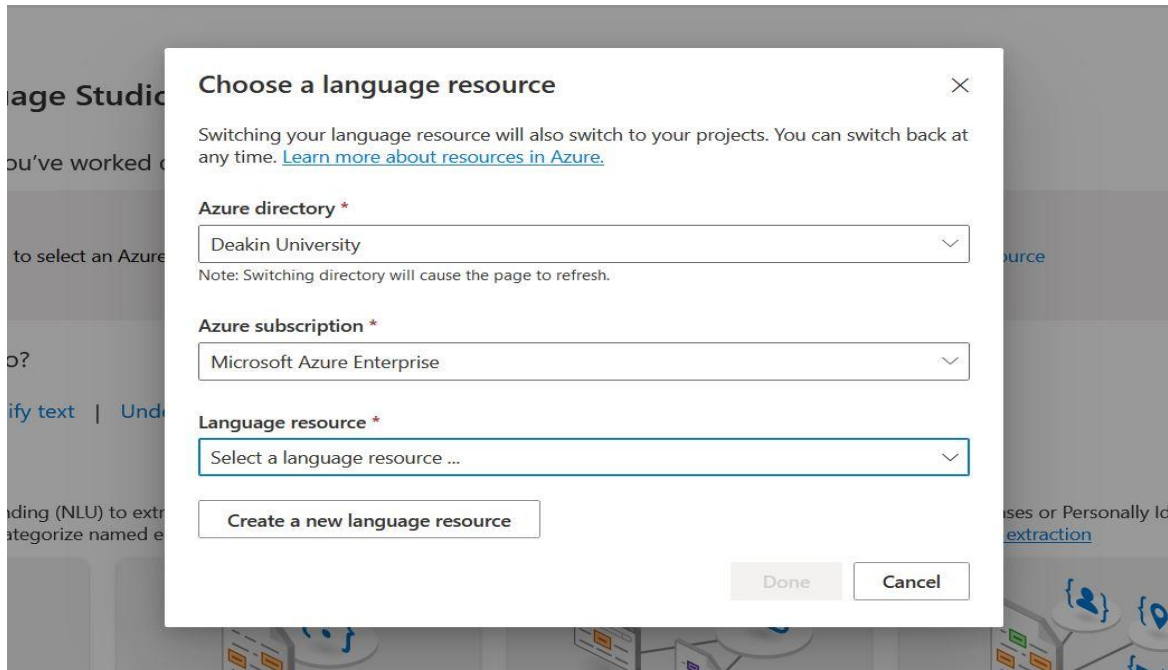
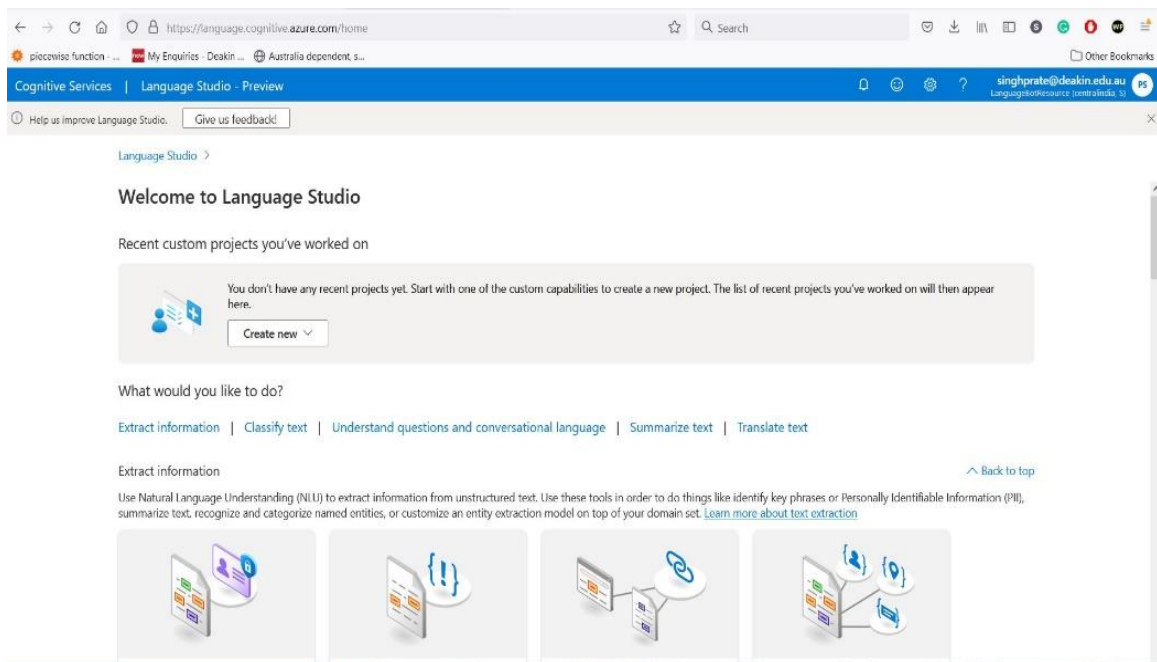


Assignment 6.1: LUIS and QnA Maker

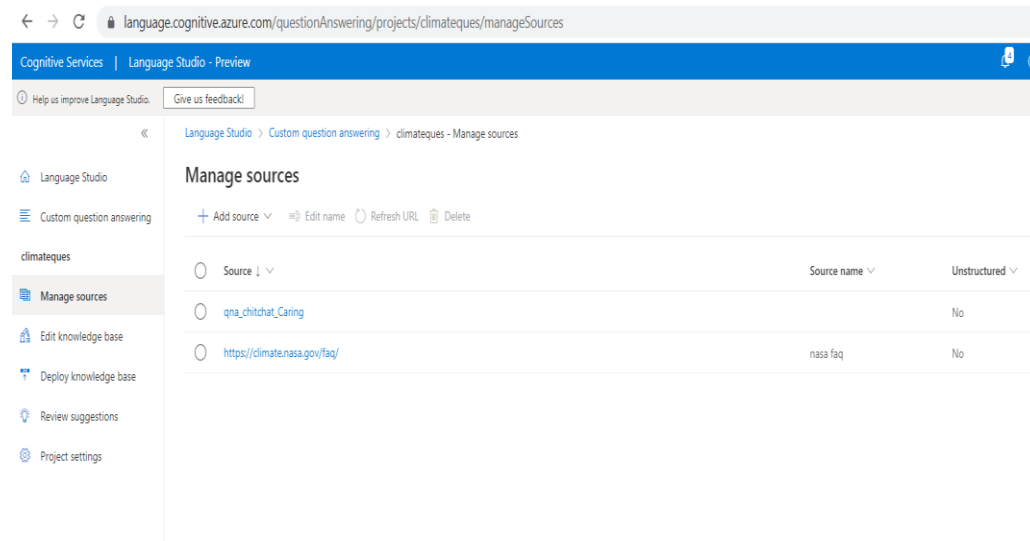
Step 1: To create a custom QnA Bot we first need to create a language resource:



Step 2: Once the language resource is created, we link Azure Language Studio with the created language resource:



Step 3: In the Language Studio we create a new project for custom QnA Bot. To this project we add knowledge base for the bot to use. As this is a bot that answers questions related to climate change we add question bank from [1]:



Language Studio - Preview

Help us improve Language Studio. Give us feedback!

Language Studio > Custom question answering > climateques - Manage sources

Manage sources

+ Add source Edit name Refresh URL Delete

Source	Source name	Unstructured
Source		Unstructured
qna_chitchat_Caring		No
https://climate.nasa.gov/faq/	nasa faq	No

Step 4: Then deploy this knowledge base and create the bot. The following picture shows the published bot:

Subscription ID : 7e620ed9-7ead-4518-be51-94fb4680c9ee Linked app service : [climate-bot-instance](#)

Tags (edit) : [Click here to add tags](#)

Build enterprise-grade conversational AI

Develop enterprise-grade, conversational AI experiences, while maintaining control of your data. Edit your bot in Bot Framework Composer or SDK, host your bot in any environment and enable customers from a variety of channels, such as your app or website, Direct Line Speech, Microsoft Teams and more. [Learn more](#)



Get set up with local development

Download your bot's source code, start building locally using your preferred dev environment, and add intelligence using Microsoft's [services](#). Note: For User-Assigned Managed Identity and Single Tenant app, Azure Portal's 'Open in Composer' link is not yet supported for bots with these app types. BotFramework SDK (C# or Javascript) version 4.15.0 or higher is needed for these app types.

[Download bot source code](#)



Test and refine your bot

Refined and debug locally with [Emulator](#), and test your bot online in [Web Chat](#). Learn more about [testing](#) and [debugging](#).

[Test in Web Chat](#)

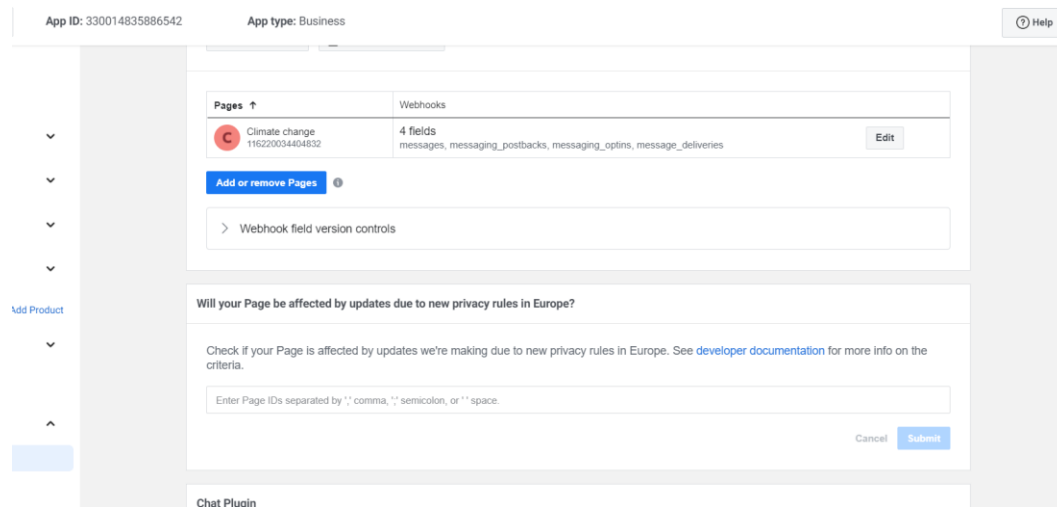


Publish to Azure

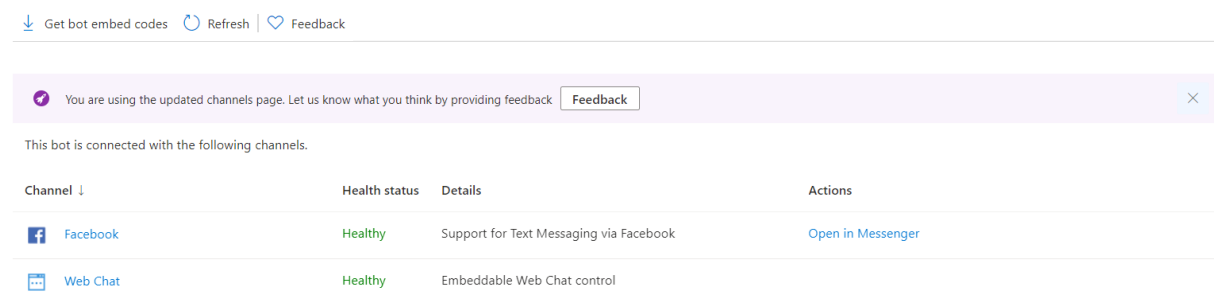
When you are ready, publish your bot to Azure and [connect to channels](#). Learn about publishing [directly to Azure](#) and [continuous deployment](#).

[Connect to channels](#)

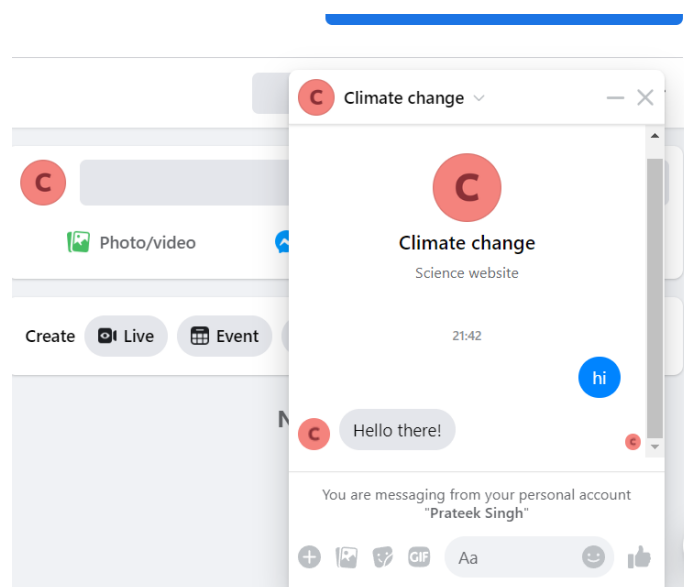
Step 5: Once the bot is published, it is linked to the FB page using channels section. Use the Meta for developers to connect the bot to the FB page:



After publishing we can see the bot is active on the FB page as well as the Testing Web Chat channel:



We can interact with our bot in real time on the FB page:



Step 6: To test the deployed bot with Azure SDK, first the dependencies must be installed:

```
In [1]: pip install azure-ai-language-questionanswering

Requirement already satisfied: azure-ai-language-questionanswering in c:\users\singh\anaconda3\lib\site-packages (1.0.0)
Requirement already satisfied: msrest>=0.6.21 in c:\users\singh\anaconda3\lib\site-packages (from azure-ai-language-questionanswering) (0.6.21)
Requirement already satisfied: azure-core<2.0.0,>=1.19.1 in c:\users\singh\anaconda3\lib\site-packages (from azure-ai-language-questionanswering) (1.21.1)
Requirement already satisfied: requests>=2.18.4 in c:\users\singh\anaconda3\lib\site-packages (from azure-core<2.0.0,>=1.19.1->azure-ai-language-questionanswering) (2.25.1)
Requirement already satisfied: six>=1.11.0 in c:\users\singh\anaconda3\lib\site-packages (from azure-core<2.0.0,>=1.19.1->azure-ai-language-questionanswering) (1.15.0)
Requirement already satisfied: requests-oauthlib>=0.5.0 in c:\users\singh\anaconda3\lib\site-packages (from msrest>=0.6.21->azure-ai-language-questionanswering) (1.3.1)
Requirement already satisfied: isodate>=0.6.0 in c:\users\singh\anaconda3\lib\site-packages (from msrest>=0.6.21->azure-ai-language-questionanswering) (0.6.1)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\singh\anaconda3\lib\site-packages (from msrest>=0.6.21->azure-ai-language-questionanswering) (2020.12.5)
Requirement already satisfied: chardet<5,>=3.0.2 in c:\users\singh\anaconda3\lib\site-packages (from requests>=2.18.4->azure-core<2.0.0,>=1.19.1->azure-ai-language-questionanswering) (4.0.0)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in c:\users\singh\anaconda3\lib\site-packages (from requests>=2.18.4->azure-core<2.0.0,>=1.19.1->azure-ai-language-questionanswering) (1.26.4)
Requirement already satisfied: idna<3,>=2.5 in c:\users\singh\anaconda3\lib\site-packages (from requests>=2.18.4->azure-core<2.0.0,>=1.19.1->azure-ai-language-questionanswering) (2.10)
Requirement already satisfied: oauthlib>=3.0.0 in c:\users\singh\anaconda3\lib\site-packages (from requests-oauthlib>=0.5.0->msrest>=0.6.21->azure-ai-language-questionanswering) (3.2.0)
```

Step 7: After that, the required libraries are imported and connected with the Question Answering Client:

```
In [2]: from azure.core.credentials import AzureKeyCredential
        from azure.ai.language.questionanswering import QuestionAnsweringClient

In [3]: #connect with created resource using endpoint and secret key
        endpoint = "https://westus2.api.cognitive.microsoft.com/"
        key_cred = AzureKeyCredential("2ed59c25a82542c78db18f0a5a2d0485")
        _project_name = "climateques"
        client = QuestionAnsweringClient(endpoint, key_cred)
```

Step 8: The bot can be tested using sample questions, the confidence level for the questions which are difficult are significantly low than those of easy ones.

```
In [4]: sample_questions = ["What is global warming",
                             "Is Sun causing global warming?",
                             "How do we tackle climate change"]

        for ques in sample_questions:
            bot_output = client.get_answers(question = ques,
                                             project_name = _project_name,
                                             deployment_name = "production")

            for answer_ele in bot_output.answers:
                print ("Question: {}".format(ques))
                print ("Ans: {}".format(answer_ele.answer))
                print ("Conf: {}".format(answer_ele.confidence))
                print ("_____")

        Question: What is global warming
        Ans: "Global warming" refers to the long-term warming of the planet. "Climate change" encompasses global warming, but refers to the broader range of changes that are happening to our planet, including rising sea levels; shrinking mountain glaciers; accelerating ice melt in Greenland, Antarctica and the Arctic; and shifts in flower/plant blooming times.
        [detailed answer](https://climate.nasa.gov/faq/12)
        Conf: 0.7513

        Question: Is Sun causing global warming?
        Ans: No. The Sun can influence Earth's climate, but it isn't responsible for the warming trend we've seen in recent decades.
        [detailed answer](https://climate.nasa.gov/faq/14)
        Conf: 0.98

        Question: How do we tackle climate change
        Ans: Major climate research organizations worldwide have developed mathematically rigorous, peer-reviewed data-processing methods to identify and compensate for changes in observing conditions.
        [detailed answer](https://climate.nasa.gov/faq/38)
        Conf: 0.4743
```

References

[1] <https://climate.nasa.gov/faq/>