

Twilio for Experience Sampling

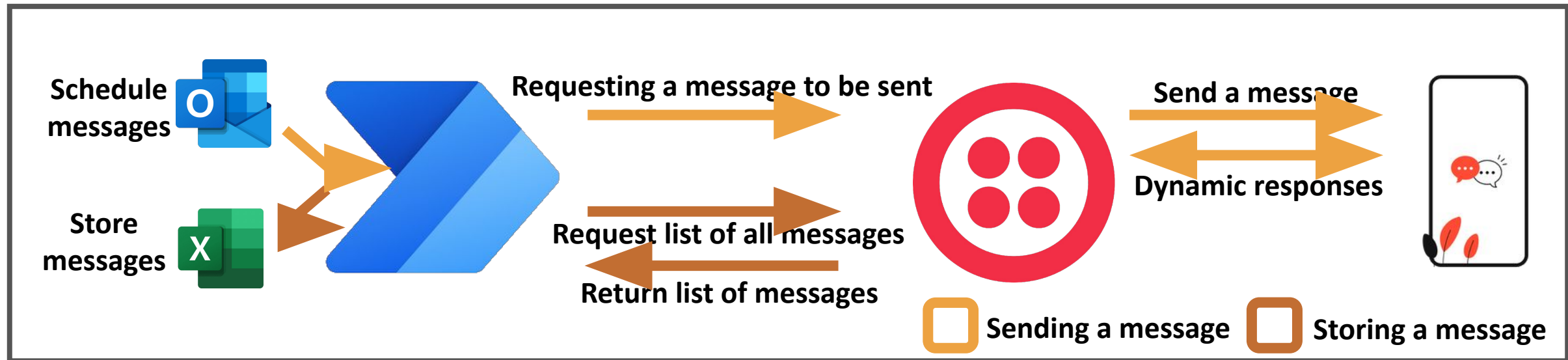
Please note that a number of the following slides were originally by Sydney Charitos and have been adapted by me (Jehan Koorjee) for the purpose of this project

Overview

In this workshop you will learn:

- How to send and receive messages through Twilio.
- The basics of how to use Twilio Studio for SMS messaging.
- How to integrate Twilio with other services Microsoft Power Automate and Excel

End of workshop take-home:



Before the Workshop: (10 mins)

1. Setup your Twilio Account (<https://www.twilio.com/>). If you need any help follow the walkthrough which is covered over the next couple of slides. 5 min
 - I. You will need a valid email address and a UK phone number. If you do not have a UK phone number, please get in contact before the workshop.

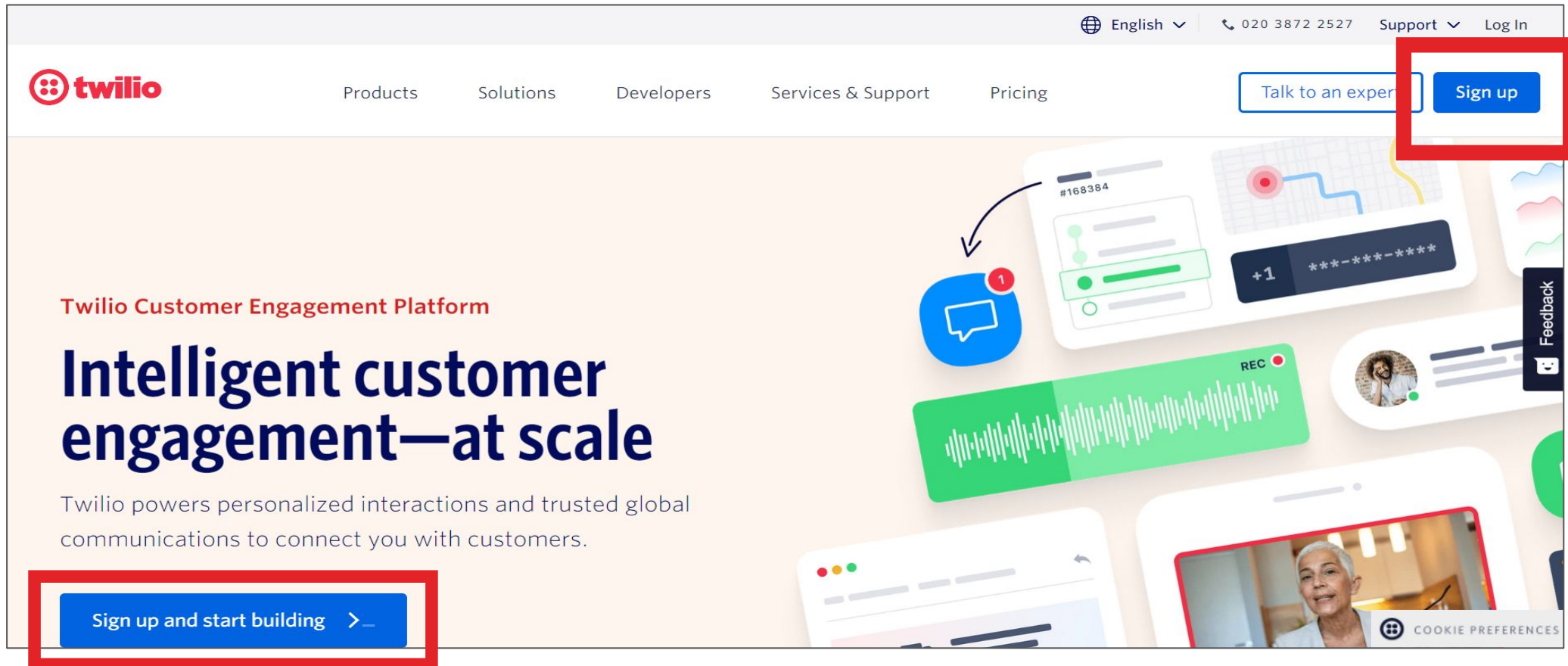
1. Watch an introductory Twilio video <https://www.twilio.com/docs/studio/user-guide> 5 min

- Optional:**
Watch a relevant video on building SMS surveys (recommended but not required) <https://www.twilio.com/docs/studio/tutorials/how-to-conduct-a-survey> 9 min

Sign up for Twilio

Setup your Twilio Account (<https://www.twilio.com/>)

1. Navigate to <https://www.twilio.com/> and click a sign-up button as shown by red squares.



2. Enter in your details.
 - Please use an email address you will have long-term access to.
2. You will be asked to verify your email and phone number.
 - Use a UK number

Verify you're a human to start your free trial

Verify Email

✓

Your email has been verified.

Verify Phone Number

NUMBER

UK

▼

+44


Phone Number

Verify

Why verify a phone number?

Want to verify with a Call instead of SMS?

We will contact you at the number above with a verification code.



Get started with a free Twilio account.
No credit card required.

WITH TWILIO YOU CAN BUILD:

✓ SMS marketing

✓ Omnichannel contact center

✓ Call tracking

✓ Web chat

✓ Push notifications

✓ Alerts and notifications

✓ Phone verification

First Name *

Last Name *


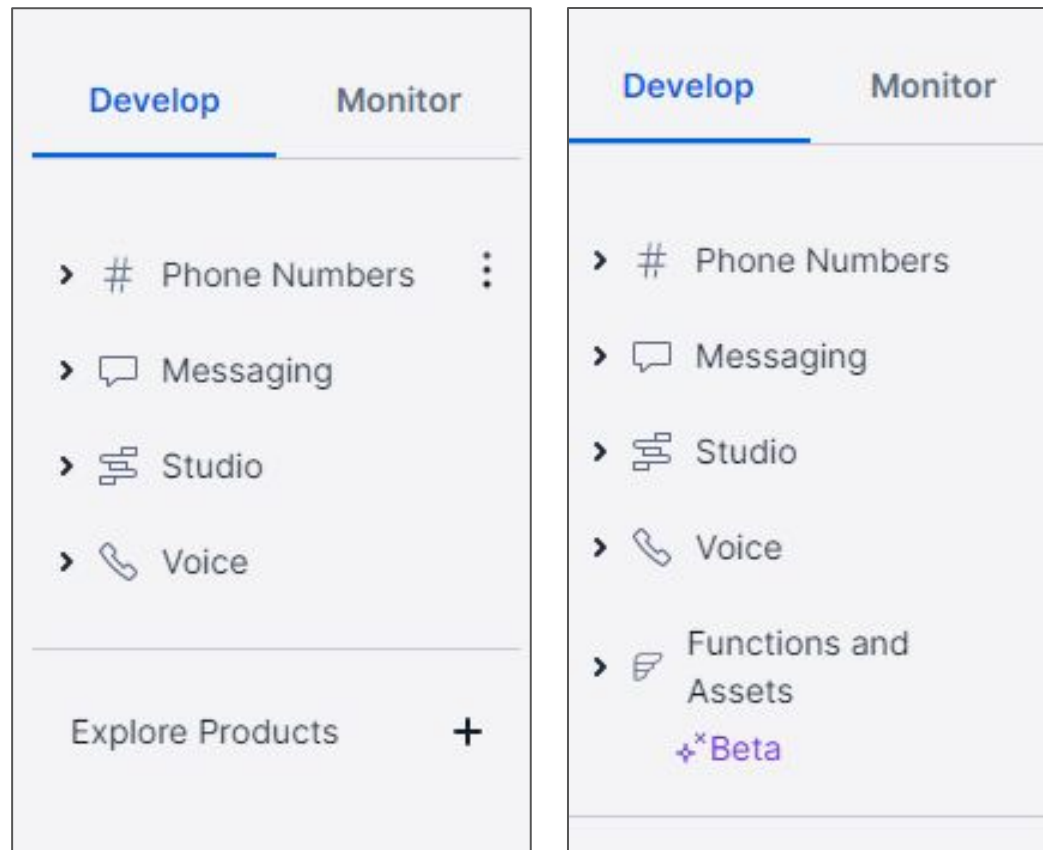
Email *

Password (16+ Characters) *

☐ I accept the [Twilio Terms of Service](#) and have read the [Twilio Privacy Notice](#). If I am a micro- or small enterprise or a not-for-profit organization in the EEA or UK, I agree to the [European Electronic Communications Code Rights Waiver](#).

Start your free trial

4. Enter in some more details about how you plan to use Twilio.
- For the option “How do you want to build with Twilio” select with no code at all. By selecting this option, you reduce navigation options to the core functionality that will be discussed in this workshop.



Ahoy test test, welcome to Twilio!

Tell us a bit about yourself so we can personalize your experience. You will have access to all Twilio products.

• Which Twilio product are you here to use?

• What do you plan to build with Twilio?

• How do you want to build with Twilio?

☐ With code
Customize exactly what you want

☐ With minimal code
Build on top of our code samples

☐ With no code at all
Launch a starter app with no code

Your billing country is United Kingdom. [Change](#)

[Get Started with Twilio](#)

Plan for Workshop

Task 1: Phone setup

Buy a Twilio number and send a message to your phone.

Task 2: Basic Studio Use

Create a one question survey using Twilio Studio

Task 3: Short Survey Implementation

Use Microsoft Power Automate to connect your short survey in Twilio to an Outlook calendar and Excel



There is a summary of different technical terms on the final slide of this deck. Relevant technical terms will be highlighted in these information boxes at the beginning of the task.

Task 1: Phone Setup

Buy a Twilio number and send a message to your phone.

You will purchase a **Twilio Phone Number** and use it to send a text to your phone showing that the connection is working, and you can progress to more complex control structures. This task will be broken into four stages:

1. Get to the correct account page's console
2. Buy a Twilio Phone Number
3. Send a test text



Twilio Phone Number

... can be controlled virtually via Twilio

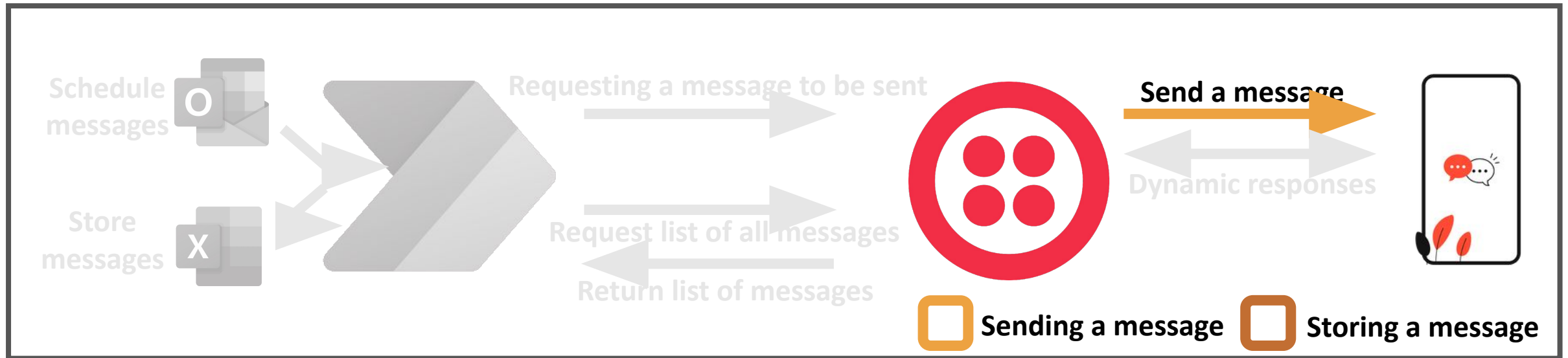


Twilio Console

... is the home page for all the different functionality Twilio offers.

Goal:

Develop a way to send a message from Twilio to your phone.



1. Get to the correct account page

If you are on this page – congratulations, you are on the correct page!

Please follow along the next set of instructions anyway just so you understand what to do when you're not.

The screenshot shows the Twilio Console interface. At the top, a dark blue header bar contains the Twilio logo, the text 'Console', 'My first Twilio account', a dropdown arrow, a green badge saying 'Trial: £11.7955 Upgrade', a search bar with 'Jump to...', and links for 'Account', 'Billing', and a user profile 'tt test'. Below the header, a left sidebar has tabs for 'Develop' and 'Monitor'. Under 'Develop', there are links for '# Phone Numbers', 'Messaging', 'Studio', and 'Voice'. Below these is 'Explore Products' with a plus icon. The main content area has a large heading 'Ahoy test, welcome to Twilio!'. Below this heading is a section titled 'Connect to 3rd-party applications' with the text 'You'll need 3 things to use Twilio with most 3rd-party applications:'. It lists three items: 'Account SID and Auth token' (checked), 'Twilio phone number' (checked), and 'Upgraded Twilio account' (checked). Below the list is a button 'Get a trial phone number' and a link 'Read 3rd-party integration FAQ'. To the right of this section is an illustration of two people stacking blocks. Further right is a section titled 'Invite teammates' with the text 'Add developers in your team to your account.' and a button 'Invite teammates →'. Below that is a section titled 'Talk to Sales' with the text 'Connect with a Twilio expert to find out what products and plans best suit your needs.' and a button 'Talk to Sales ↗'. At the bottom, there are two expandable sections: 'Account Info' and 'Helpful links'. The 'Account Info' section shows 'Account SID' and 'Auth Token' with input fields and a 'Show' button. The 'Helpful links' section contains links for 'How does Twilio work?', 'API documentation', and a description of a 2-minute video.

Console
My first Twilio account
Trial: £11.7955 Upgrade
Jump to...
Account Billing tt test

Develop Monitor

Phone Numbers
Messaging
Studio
Voice

Explore Products +

Ahoy test, welcome to Twilio!

Connect to 3rd-party applications

You'll need 3 things to use Twilio with most 3rd-party applications:

- ✓ Account SID and Auth token
- ✓ Twilio phone number
- ✓ Upgraded Twilio account

Get a trial phone number

[Read 3rd-party integration FAQ](#)

Invite teammates

Add developers in your team to your account.

Invite teammates →

Talk to Sales

Connect with a Twilio expert to find out what products and plans best suit your needs.

Talk to Sales ↗

Account Info

Account SID

Auth Token

Show

Helpful links

[How does Twilio work?](#)

Understand how to use Twilio in a 2-minute video.

[API documentation](#)

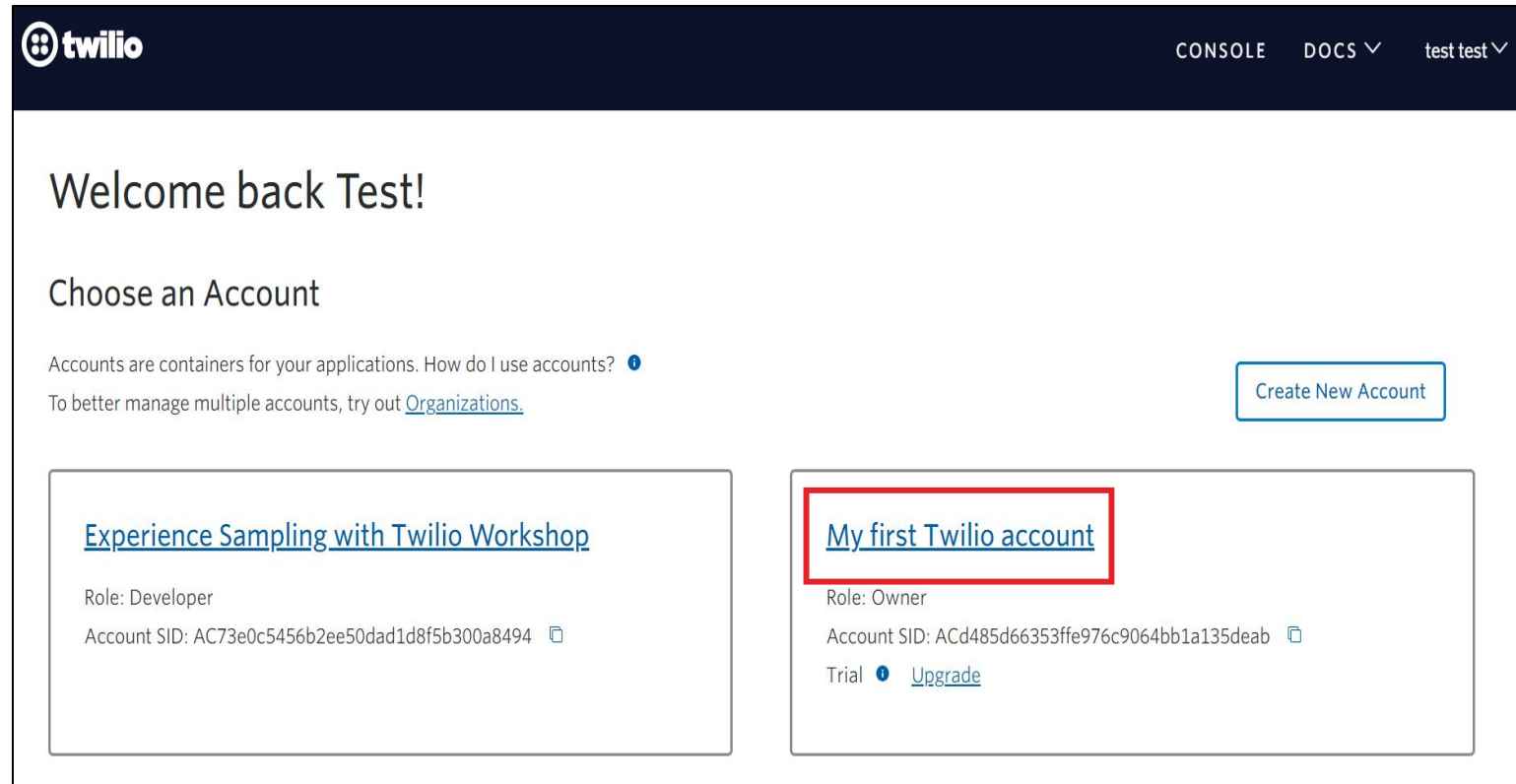
Learn the basics of Twilio APIs.

1. Get to the correct account page

This page is the **accounts overview** page, which shows you all the accounts that you either own or have had shared with you.

You need to navigate to your newly formed Twilio account – to do this you need to:

- I. Click the **“My first Twilio account”** title.



The screenshot shows the Twilio accounts overview page. The header includes the Twilio logo, 'CONSOLE', 'DOCS', and 'test test'. The main content area says 'Welcome back Test!' and 'Choose an Account'. Below this, there is a link to 'Experience Sampling with Twilio Workshop' and a link to 'My first Twilio account'. The 'My first Twilio account' card is highlighted with a red box. It shows the role 'Owner', the account SID 'ACd485d66353ffe976c9064bb1a135deab', and a 'Trial' status with an 'Upgrade' link.

twilio

CONSOLE DOCS test test

Welcome back Test!

Choose an Account

Accounts are containers for your applications. How do I use accounts? ⓘ
To better manage multiple accounts, try out [Organizations](#).

Create New Account

[Experience Sampling with Twilio Workshop](#)

Role: Developer
Account SID: AC73e0c5456b2ee50dad1d8f5b300a8494 ⓘ

[My first Twilio account](#)

Role: Owner
Account SID: ACd485d66353ffe976c9064bb1a135deab ⓘ
Trial ⓘ [Upgrade](#)

Console Tour

You should now be on the account page for **My first Twilio account**. This page is also called the **console** for the project as it is the control center.

The next couple of slides will have a brief introduction to the **console**.

The screenshot displays the Twilio Console interface. At the top, a dark blue header bar contains the Twilio logo, the text "Console", the account name "My first Twilio account", and a trial status "Trial: £11.7955" with an "Upgrade" button. Below the header, a left sidebar lists navigation options: "Develop" (selected), "Monitor", "Phone Numbers", "Messaging", "Studio", "Voice", "Explore Products", and "Docs and Support". The main content area features a large welcome message "Ahoy test, welcome to Twilio!". Below this, a section titled "Connect to 3rd-party applications" lists three requirements: "Account SID and Auth token", "Twilio phone number", and "Upgraded Twilio account", all marked as complete. It includes a button "Get a trial phone number" and a link "Read 3rd-party integration FAQ". An illustration of two figures stacking blocks is on the right. The "Account Info" section shows the "Account SID" and "Auth Token" (masked with dots) with copy icons. A warning icon and text advise storing the token securely, with a "Learn more" link. At the bottom, a note states: "You are on a trial account. You can only send messages and make calls to [verified phone numbers](#). Learn more about your [trial account](#)".

Console
My first Twilio account Trial: £11.7955 Upgrade

Develop Monitor

- > # Phone Numbers
- > Messaging
- > Studio
- > Voice

Explore Products +

Docs and Support

Ahoy test, welcome to Twilio!

Connect to 3rd-party applications

You'll need 3 things to use Twilio with most 3rd-party applications:

- ✓ Account SID and Auth token
- ✓ Twilio phone number
- ✓ Upgraded Twilio account

Get a trial phone number

[Read 3rd-party integration FAQ](#)

Account Info

Account SID

Auth Token

Always store your token securely to protect your account. [Learn more](#)

You are on a trial account. You can only send messages and make calls to [verified phone numbers](#). Learn more about your [trial account](#)



The highlighted box on the left shows you the navigation panel which contains links to four different topic areas.

The main areas of interest to us during this session will be **Phone Numbers**, **Messaging** and **Studio**.

Phone Numbers contains functionality to manage your Twilio phone number, which is a virtual number you can control.

Messaging contains functionality to manage message sending. This section will not be used frequently as this functionality is mostly designed for individuals that are not using Twilio Studio.



Studio is the functionality that allows users to generate workflows (Twilio **Flows**) rather than needing to program specific functions. This will be covered in more detail throughout the session.

 Console
My first Twilio account  Trial: £11.7955 [Upgrade](#)

Develop Monitor

[Phone Numbers](#)
[Messaging](#)
[Studio](#)
[Voice](#)

Explore Products +

 Docs and Support 

Ahoy test, welcome to Twilio!


Connect to 3rd-party applications

You'll need 3 things to use Twilio with most 3rd-party applications:

- ✓ Account SID and Auth token
- ✓ Twilio phone number
- ✓ Upgraded Twilio account


Get a trial phone number

[Read 3rd-party integration FAQ](#)




▼ Account Info


Account SID



Auth Token


.....

 Show

 Always store your token securely to protect your account. [Learn more](#)


You are on a trial account. You can only send messages and make calls to [verified phone numbers](#). Learn more about your [trial account](#)

This small button in the shape of the Twilio logo will take you back to the **accounts overview** page.

 twilio CONSOLE DOCS test test


Welcome back Test!



Choose an Account

Accounts are containers for your applications. How do I use accounts? 

To better manage multiple accounts, try out [Organizations](#).

Create New Account

[Experience Sampling with Twilio Workshop](#)
Role: Developer
Account SID: AC73e0c5456b2ee50dad1d8f5b300a8494 

[My first Twilio account](#)
Role: Owner
Account SID: ACd485d66353ffe976c9064bb1a135deab 
Trial  [Upgrade](#)

The screenshot shows the Twilio console interface. At the top, a dark blue header bar contains the Twilio logo, the text "Console", and a dropdown menu labeled "My first Twilio account". A red box highlights a trial balance of "£11.7955" with an "Upgrade" link next to it. Below the header, the left sidebar has tabs for "Develop" and "Monitor", and a list of navigation items: "Phone Numbers", "Messaging", "Studio", "Voice", "Explore Products", and "Docs and Support". The main content area displays a welcome message "Ahoy test, welcome to Twilio!". Below this is a section titled "Connect to 3rd-party applications" with a list of requirements: "Account SID and Auth token", "Twilio phone number", and "Upgraded Twilio account". A button "Get a trial phone number" and a link "Read 3rd-party integration FAQ" are also present. An illustration of two people stacking blocks is shown. The "Account Info" section displays the "Account SID" and "Auth Token" (masked with dots) with copy icons. A warning message states: "Always store your token securely to protect your account. Learn more". At the bottom, a note says: "You are on a trial account. You can only send messages and make calls to verified phone numbers. Learn more about your trial account".

This section shows how much money you have on the account.

Costs to consider are:

- £1 (max) on a Twilio phone number/ month.
- £0.04 to send an SMS.
- £0.0075 to receive an SMS.

This trial account should start with around £11.

There are Twilio funds for Educational Institutions- please check out:

<https://support.twilio.com/hc/en-us/articles/4443965939995-Impact-Access-Program-Eligibility-Guidelines>

⊕

Console

My first Twilio account

Trial: £11.7955 Upgrade

Develop

Monitor

> # Phone Numbers

> Messaging

> Studio

> Voice

Explore Products

+

Docs and Support

:

Ahoy test, welcome to Twilio!


Connect to 3rd-party applications

You'll need 3 things to use Twilio with most 3rd-party applications:

- ✓ Account SID and Auth token
- ✓ Twilio phone number
- ✓ Upgraded Twilio account

Get a trial phone number

[Read 3rd-party integration FAQ](#)



▼ Account Info

Account SID

.....

Auth Token

.....

⚠ Always store your token securely to protect your account. [Learn more](#)

You are on a trial account. You can only send messages and make calls to [verified phone numbers](#). Learn more about your [trial account](#)

A small note is that under the **Account Info** tab you are displayed with an Account SID and authentication token. It's important to know that these should remain **private** from people you don't know. Think of them as your banking sort code and account number meaning they are unique identifiers and once known can be used to control your account.

2. Buy a phone number

We will be buying a Twilio Phone Number so you can access and control phone functionality virtually. The phone number should match the region of the phone numbers you want to communicate with. As we are in the UK, we will be buying a UK number. Additionally, as this workshop is focused on SMS, we will ensure that the Twilio Phone Number has SMS capability.

1. Select 'Phone Numbers' -> 'Manage' -> **'Buy a number'** topic from the left side navigation panel as shown in Figure 1.
1. At the top of the Buy a Number page enter in the United Kingdom as your country and ensure the SMS capability is ticked. **You may need to untick fax and voice to see SMS capable numbers.**

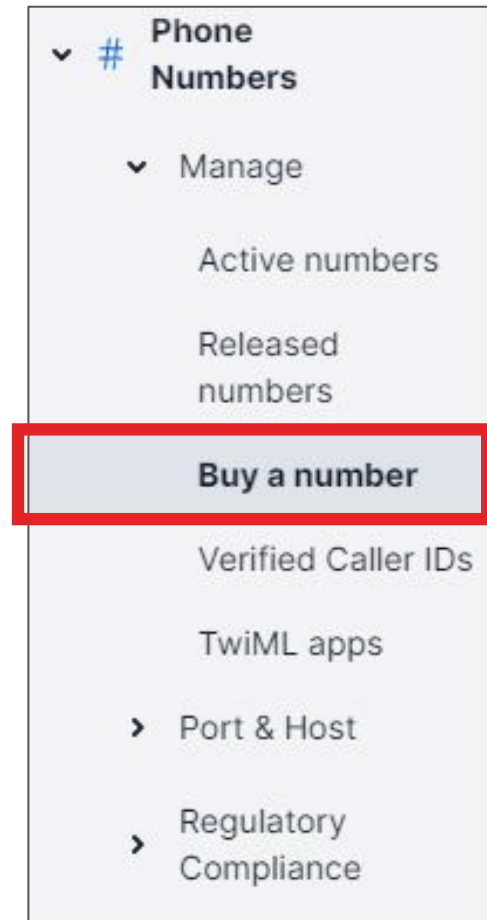


Figure 1: Left hand navigation menu selecting 'Buy a number'

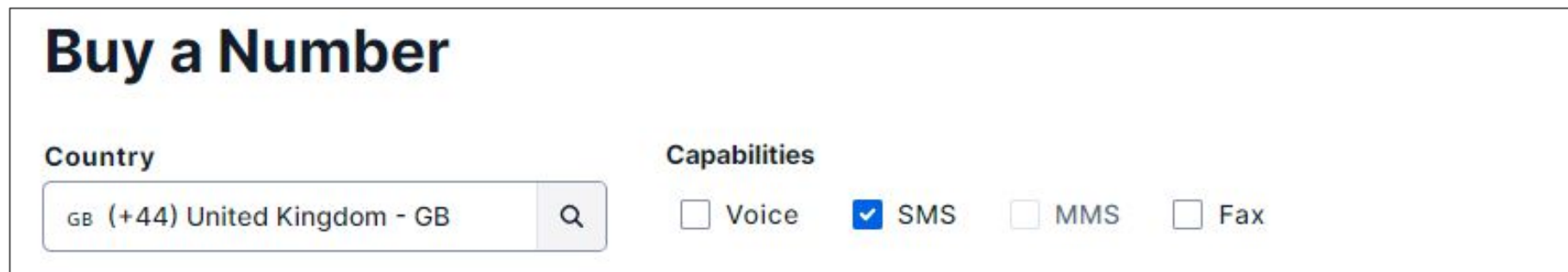
The image shows a form titled 'Buy a Number'. At the top, the title is in a large, bold, dark blue font. Below the title, there are two main sections: 'Country' and 'Capabilities'. The 'Country' section has a dropdown menu that is currently set to 'GB (+44) United Kingdom - GB'. To the right of the dropdown is a magnifying glass icon. The 'Capabilities' section has four checkboxes: 'Voice' (unchecked), 'SMS' (checked with a blue checkmark), 'MMS' (unchecked), and 'Fax' (unchecked).

Figure 2: Search configuration for a UK number with SMS capability

2. Buy a phone number

- II. Select a number which displays the **SMS symbol** and has a **monthly cost of £0.761** as shown in Figure 1. You may need to untick fax and phone to see SMS capable numbers.
- II. You click buy for a valid number and a confirmation buy pop-up will appear and confirm the number you wish to buy.
- II. You will then be asked to configure your number which is not required at this time so you can click **close**. If you do click configure its not a problem just continue to the next stage.

Review Phone Number

+44 7700 174897

£0.761 monthly fee

You'll be charged £0.761 immediately. Afterwards, you'll be charged £0.761/month *in addition* to the usage you incur on the phone number. [Learn more](#)

Capabilities

Voice

Receive incoming calls and make outgoing calls.

SMS

Send and receive text messages.

Global Routing

Routing

Regional

Voice and Messaging will be routed to the United States (US1) Region.
You can re-route in the number configuration after purchase.

Cancel

Buy +44 7700 174897

Figure 2: Review Phone Number pop up.




Number	Type	Capabilities				Address Requirement	Monthly fee	
		Voice	SMS	MMS	Fax			
+44 7723 496735 GB	Mobile					None	£0.761	Buy

Figure 1: An example of a valid number to purchase as it is displaying the SMS icon and costing £0.761/month

Step 1

Create Messaging Service

Step 2

Add senders

Step 3

Set up integration

Step 4

Add compliance info

III. Go to the console → go to Develop → Messaging → Services → Create Messaging Service

III. Name your messaging service, for “Select what you want to use Messaging for” select “Notify my users”

III. Continue to Sender Pool → Add Senders

III. For sender type select “Phone Number” → Continue

Sender Pool

A Sender represents a channel, number type, or messaging type that can receive and send messages using the Twilio Messaging API. Messaging Services come with [built-in features](#) to help you select the best Sender for your use case and scale your application.

Add Senders to Service

Select from multiple Senders like phone numbers, WhatsApp Numbers and others. Use multiple Senders for one application or use case.

Add Senders

Add Senders

Sender Type

Phone Number

SMS-capable Twilio numbers support two-way (inbound and outbound) messaging with mobile numbers from the same country. Promotional or marketing use is generally discouraged.

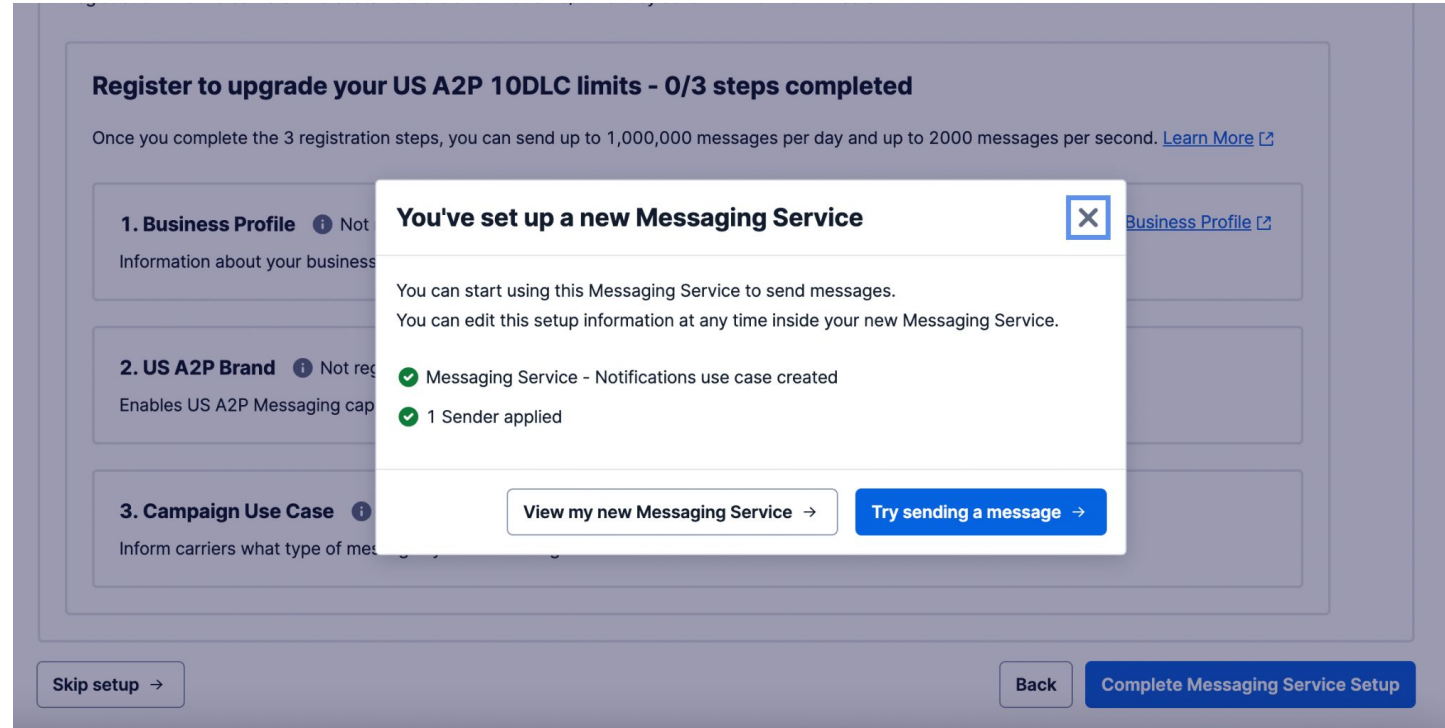
If sending to the US and Canada, get help selecting the right number with [this guide](#)

Cancel

Continue

III. Go to Step 3: Set up integration → select the default setting and continue → then press Complete Messaging Service Set Up

III. Your screen will then look like below, this means you're all set up. Now when you go to Services, you will be able to see the Sid number of your service which will start with MG



III. You now need to create a Notify service. This will allow you to send numbers to multiple phone numbers with one API request. To do this go back to your Twilio console, go to Develop, scroll down and go to Explore Products +

III. Then select the Notify Box on the Explore Products page

III. Select Visit our Quickstart Guide under SMS Notifications, follow the steps and stop when you get to the “(Optional) Create a binding for SMS” section

IMPORTANT NOTE: When asked to configure your Notify Service, you *MUST* select the messaging service that you created in the previous step, in the example below they named it “SMS Quickstart”

You will then be able to see the SID of your service

when you go to Develop → Notify → Services

The SID will start with “IS”

Configure Properties

FRIENDLY NAME SMS Quickstart

SERVICE SID IS

APN CREDENTIAL SID No value selected [Create an APN Credential here](#)

GCM CREDENTIAL SID No value selected [Create a GCM Credential here](#)

FCM CREDENTIAL SID No value selected [Create an FCM Credential here](#)

MESSAGING SERVICE SID SMS Quickstart [Create a Messaging Service here](#)

FACEBOOK MESSENGER PAGE ID No value selected [Create a Messenger Configuration here](#)


ALEXA SKILL ID No value selected [Create an Alexa Configuration here](#)

Logging Settings

LOGGING ENABLED ☒ Log each notification request and message [View your logs](#)

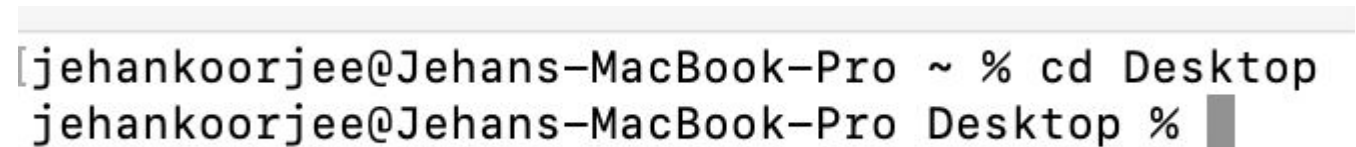
Save Cancel Delete this service

I. It's now time to send your initial text message to your participants to ask them how many times a day they would like to be contacted. To do this you need to download the Twilio file you have been given and save it on your desktop. You then need to open a terminal and move into the Twilio file. To know where you are on your computer, read the left hand of your terminal. If when you open your terminal it looks like the following, type: `cd Desktop`

A screenshot of a macOS terminal window. The title bar shows three colored window control buttons (red, yellow, green) on the left, followed by a blue folder icon and the text "jehankoorjee — -zsh — 80x24". The terminal content shows the prompt "jehankoorjee@Jehans-MacBook-Pro ~ %" followed by a grey cursor block.

```
jehankoorjee@Jehans-MacBook-Pro ~ %
```

You will then see this:

A screenshot of a terminal window showing two lines of text. The first line is the prompt "jehankoorjee@Jehans-MacBook-Pro ~ %" followed by the command "cd Desktop". The second line is the prompt "jehankoorjee@Jehans-MacBook-Pro Desktop %" followed by a grey cursor block.

```
jehankoorjee@Jehans-MacBook-Pro ~ % cd Desktop  
jehankoorjee@Jehans-MacBook-Pro Desktop %
```

jehankoorjee@Jehans-MacBook-Pro Desktop % ← tells you that you are currently on your desktop

now type: `cd Twilio`. You should then see the following

A screenshot of a terminal window showing a single line of text: the prompt "jehankoorjee@Jehans-MacBook-Pro Twilio %" followed by a grey cursor block.

```
jehankoorjee@Jehans-MacBook-Pro Twilio %
```

II. In order for our code to work, we need to do two things:

1. Set up the correct environment by installing all the required dependencies
2. Create a .env file with all the necessary information

Step 1:

Install Node.js on your computer via: <https://nodejs.org/en/download/>.

In your terminal, whilst you are in your Twilio folder, type the following commands and hit enter after each one. You may see some activity on the terminal - it will look like lots of text and things loading - this is totally normal and you should wait for this to finish before typing the next command and pressing enter.

- Command 1: `npm init -y`
- Command 2: `npm install twilio dotenv node-env-run --save`
- Command 3: `npm install xlsx`

When you run command 2, another package.json file will want to save in your folder. Make sure to keep the version you have been given - do not allow the new version to save in your folder. Allow package-lock.json to save but **not** package.json.

Step 2:

III. In your terminal, whilst in your twilio folder, run:

- `vim .env`

This will create a file called “.env” in your folder which is responsible for all your environment variables such as your Twilio account password, Twilio phone number, Twilio username, Twilio Messaging and Notify SID. Since this is all sensitive information, the file will be invisible in your Twilio folder. In order to view it, you will need to open a terminal, navigate to your Twilio folder and then type “vim .env”. This will allow you to view it again. When you run vim.env for the first time in a folder, a text editor will then open up in your terminal. Press “i” (meaning insert) this will allow you to type and make changes in the file.

In your .env file, copy and paste the following and replace the X’s with your Twilio details:

```
export TWILIO_ACCOUNT_SID= XXXXXXXXXXXXXXXXX
export TWILIO_AUTH_TOKEN= XXXXXXXXXXXXXXXXX
export TWILIO_NUMBER= XXXXXXXXXXXXXXXXX
export TWILIO_MESSAGING_SERVICE_SID= XXXXXXXXXXXXXXXXX
export TWILIO_NOTIFY_SERVICE_SID= XXXXXXXXXXXXXXXXX
```

Then press the escape button on your keyboard “esc” and then type “:wq” meaning write and quit. You will then be back to you terminal.

III. Now that you have set up your environment variables and installed all your dependencies. It is also time to run the code. Before you run the code to send the initial message to all your participants (asking them how many times a day they'd like to be contacted) you first need to input all the numbers you want to send the message to in the code. Open the file `multipack.js`. On line 8 you will see the following code.

```
const numbers = ['insertnumber1', 'insertnumber2'];
```

Replace the values in the square brackets with the phone numbers you want to send the message to. Ensure that each phone number is separated by a comma and space as shown above. Replace the *insertnumber1* etc. with your target phone numbers and ensure it is in E.164 format (see more info here: <https://www.twilio.com/docs/glossary/what-e164>). The code should then look something like:

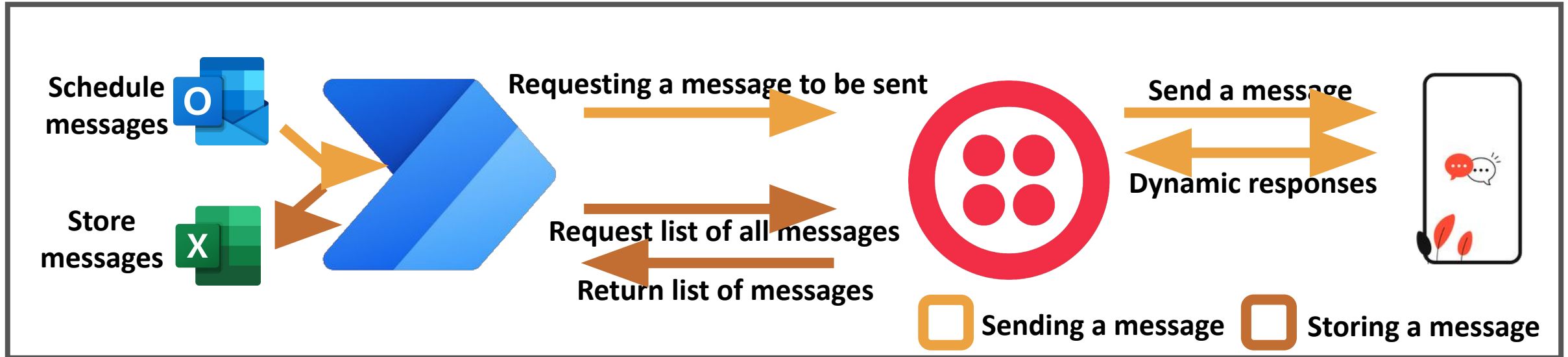
```
const numbers = ['+441111111111', '+442222222222'];
```

Then save the file → go to your terminal (ensure you're in your twilio folder) → run the file by typing the following command and pressing enter: **npm run multipack**

You have now sent your first batch of Twilio messages! :)

Goal:

By the end of this task you will have developed a way to schedule and store Twilio messages.



1. A brief Microsoft Power Automate tour

- I. Navigate to Microsoft Power Automate and login with your University of Bristol account.

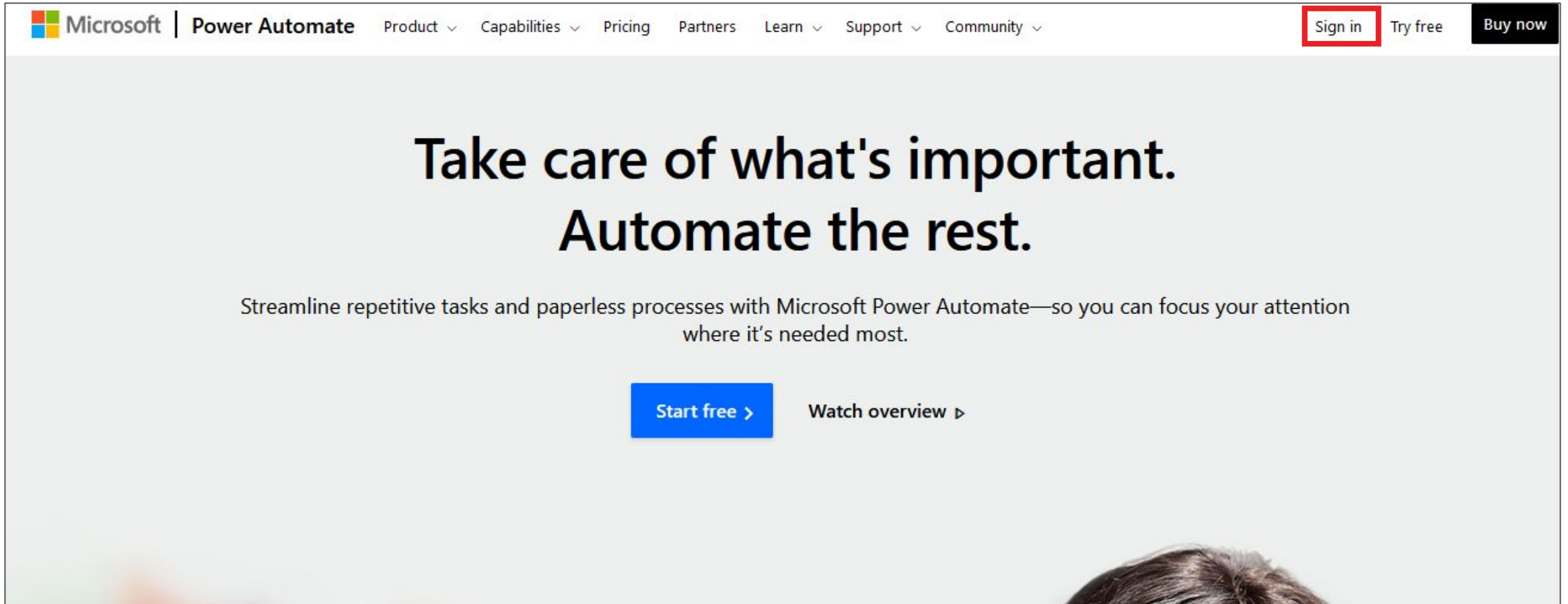


Figure 1: The Microsoft Power Automate website highlighting the Sign In button

1. A brief Microsoft Power Automate tour

You should now be on the Microsoft Power Automate home page.

On the home page you can see examples of different automations you can implement. Connecting your different applications in a way you may have not realized was possible.

The real strength of Power Automate is that it can connect different applications that have previously been difficult to join/have a technical barrier.

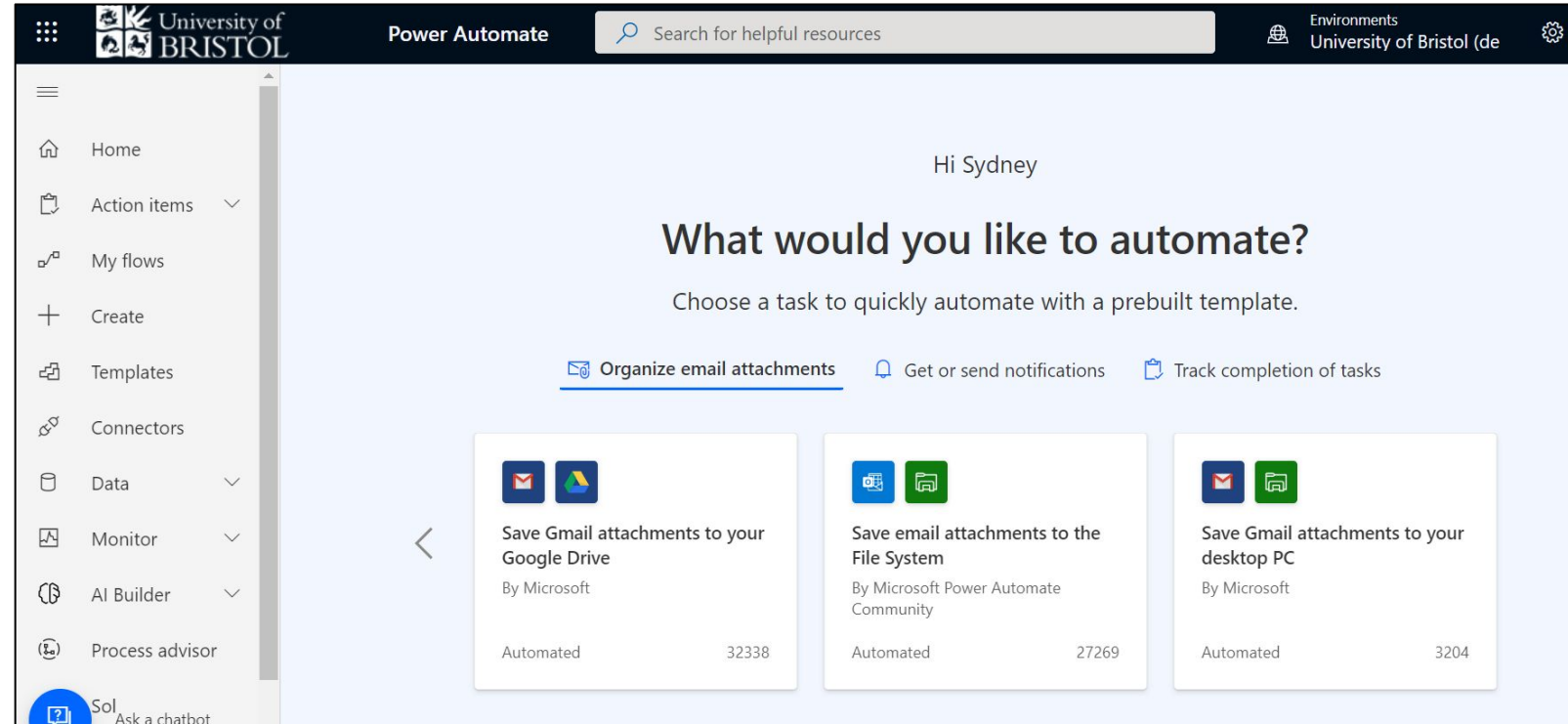


Figure 1: The Microsoft Power Automate home page

1. A brief Microsoft Power Automate tour

The **Create** tab allows you to create a new flow. The first section shows you different triggers which can be used to start the flow. The triggers that are of most interest in the context of EMA are the **Automated cloud flow** and the **Scheduled cloud flow**.

Automated cloud flow references the fact you can connect your system to start based on an event trigger. In the context of EMA a useful example of this would be to use a calendar event starting to trigger the flow. Allowing easy scheduling and control over the system. This will be how we achieve scheduled message sending.

Scheduled cloud flow is useful for repetitive tasks if you do not want to create a calendar solely for the purpose. You pay the cost for flexibility with ease of implementation. We will use this to schedule the storage of Twilio data.

Clicking a trigger takes you to the flow editor page.

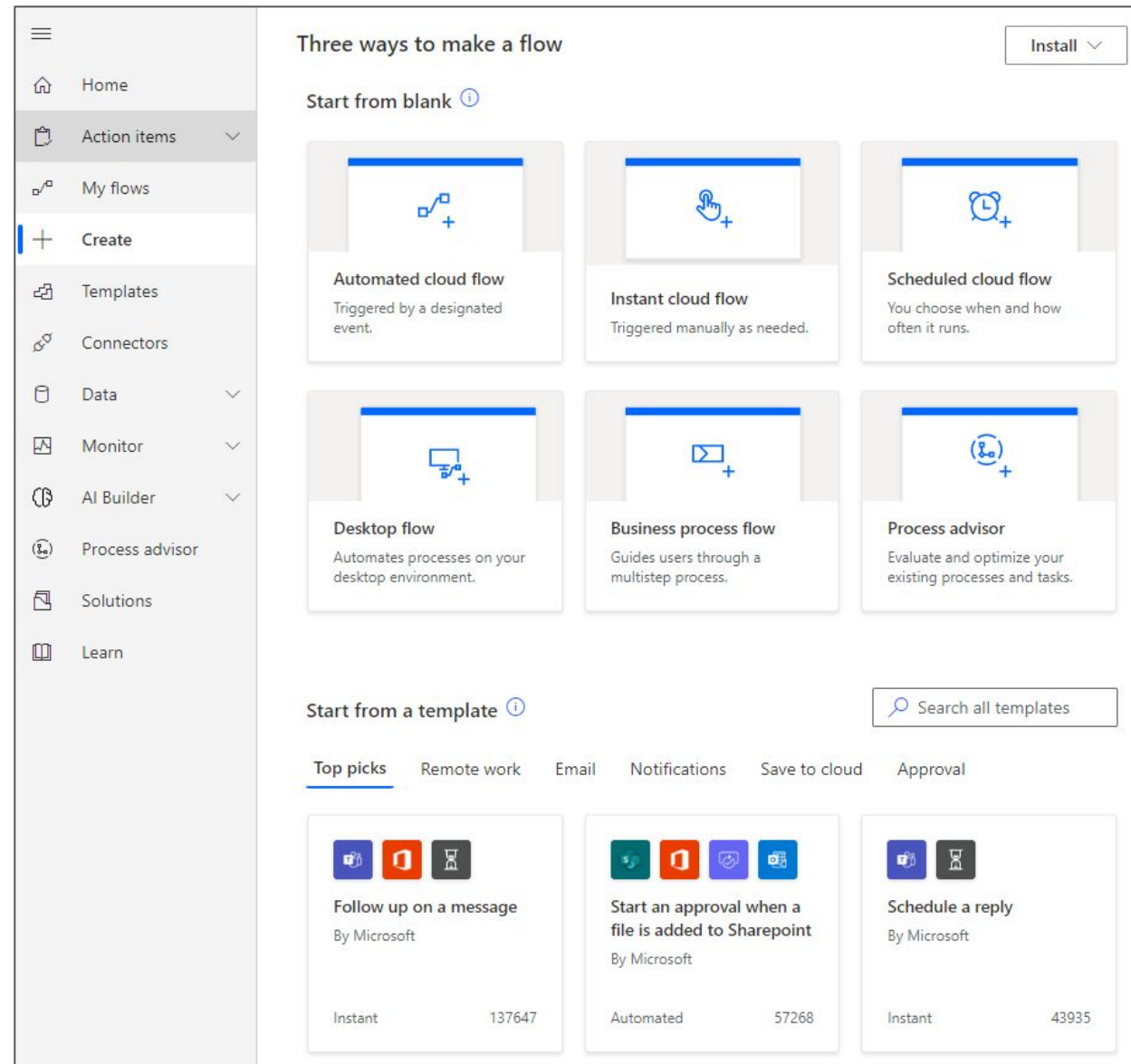


Figure 1: The Microsoft Power Automate Create tab.

1. A brief Microsoft Power Automate tour

The **Create** tab flow editor page shows the different blocks that make up your current flow. These blocks can be broken into your trigger blocks and your action blocks. Every flow needs one trigger block which in Figure 1 is the **Manually trigger a flow** trigger.

On this page you can see the option to add a new step. As you already have a trigger you will be asked to add in an **Action**. There are many kinds of action that you will be able to select, and they allow you to access the functionality of many different applications.

Additionally on this page you can see in the top right corner that you have a **Flow checker** which is useful to detect where your flow may not be working. Also, you have the **Test** function (currently grey) which allows you to bypass your trigger and run the flow.

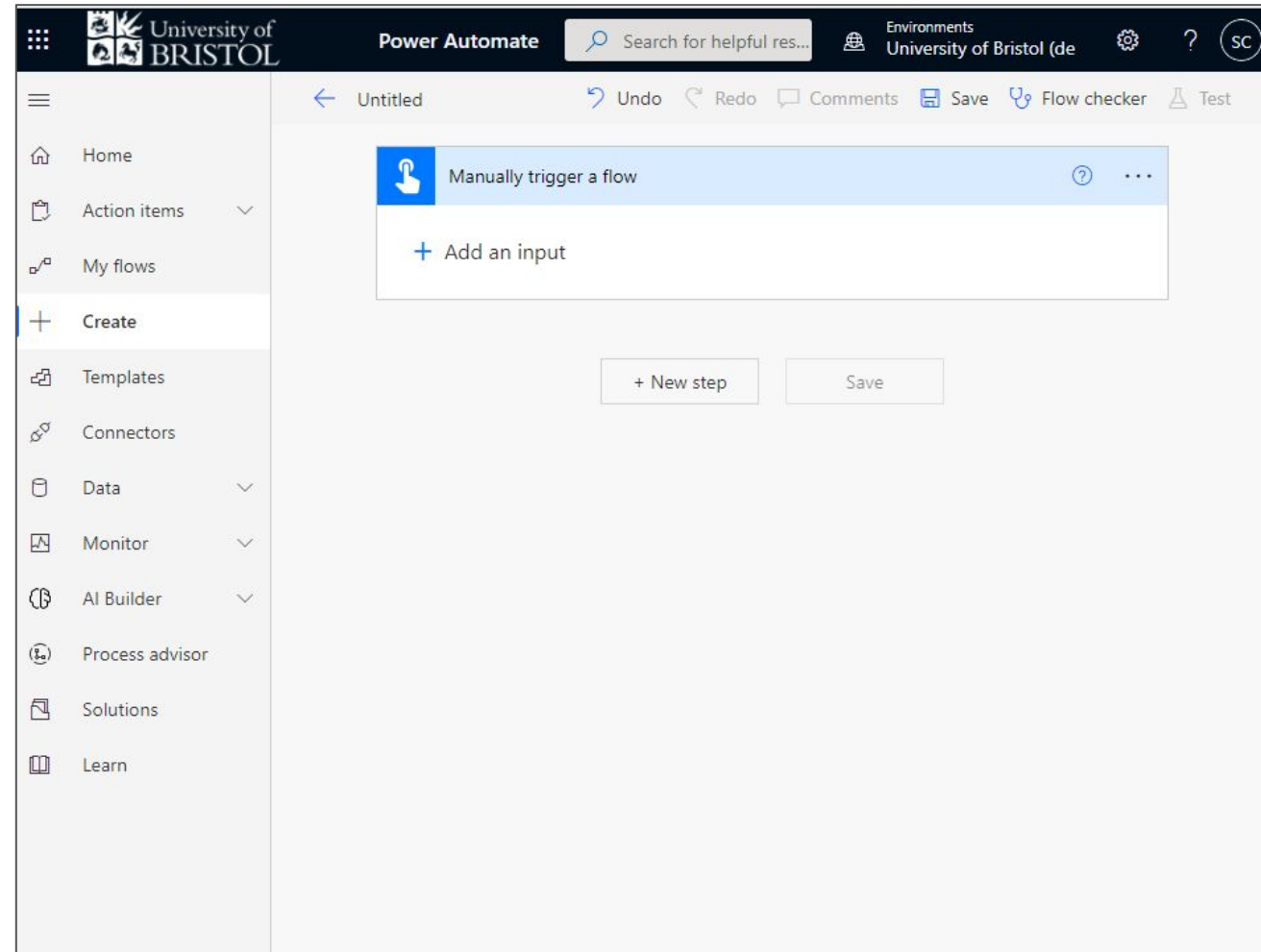


Figure 1: The Microsoft Power Automate flow editor tool within the create tab

1. A brief Microsoft Power Automate tour

While the **Create** tab is the most important for this task other relevant tabs are:

My flows this tab will show you all the flows you have created using Power Automate – for now this will be empty. By the end of task 3 you should have a working flow.

Templates contains examples of different pre-built flows you can use directly or edit and tailor to your needs.

Connectors are the different applications that can be connected as part of a Power Automate flow. It is important to note that there are certain pre-specified ways you can interact with different applications meaning while you can connect to a desired application it may not allow you to connect in the way you want. For example, Power Automate has Twilio connections but not a pre-built action which allows you to start a specific Twilio Flow – which is why we will be doing that ourselves!

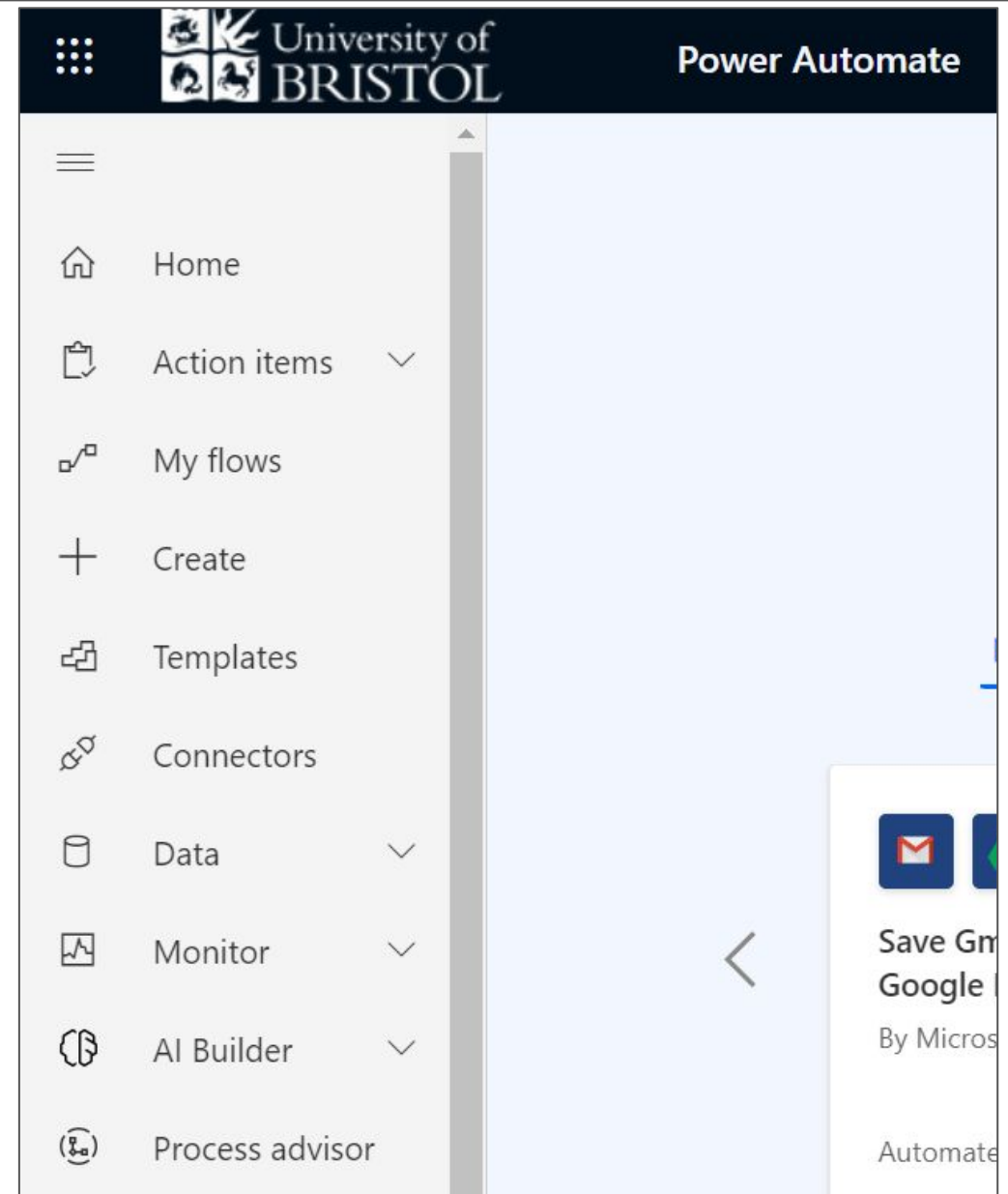


Figure 1: The Microsoft Power Automate navigation panel

1. A brief Microsoft Power Automate tour

If you would like to learn more about Power Automate you can scroll down on the home page and reach modules (Figure 1). A relevant module if you want to use Power Automate in future research is the **“Introduction to Microsoft Power Platform security and governance”**.

Additionally, you may also be interested in looking into the Microsoft Power App Chatbots – but there is no SMS functionality (Figure 2).

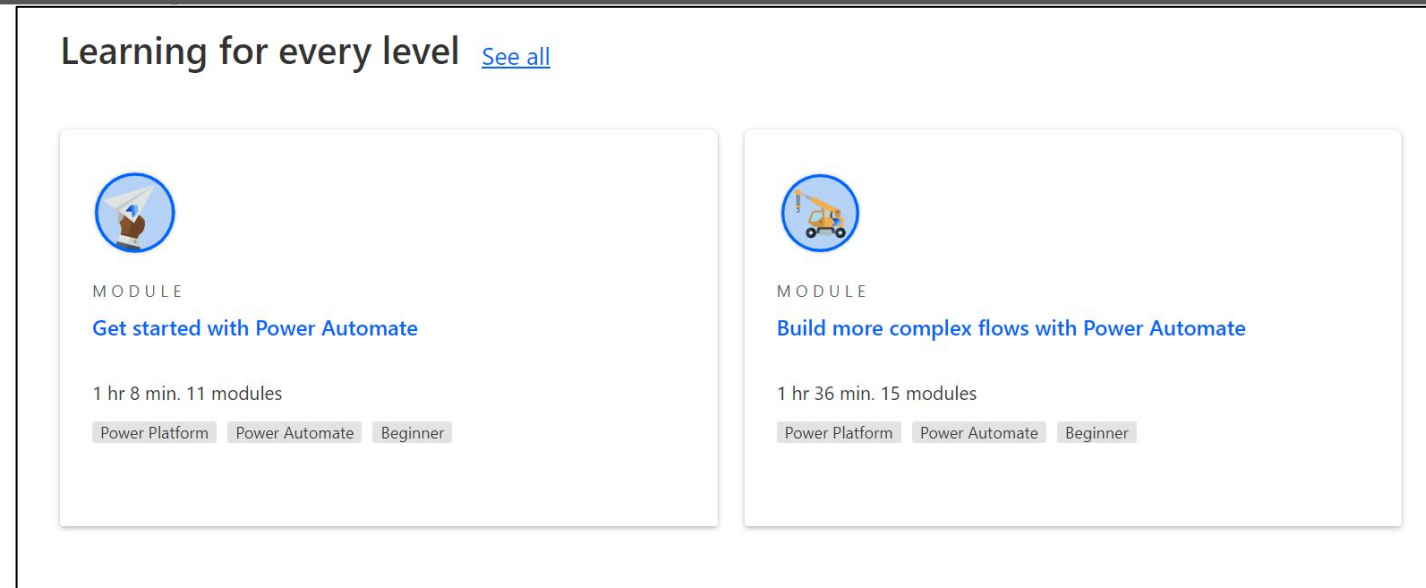


Figure 1: The Microsoft Power Automate beginner learning modules

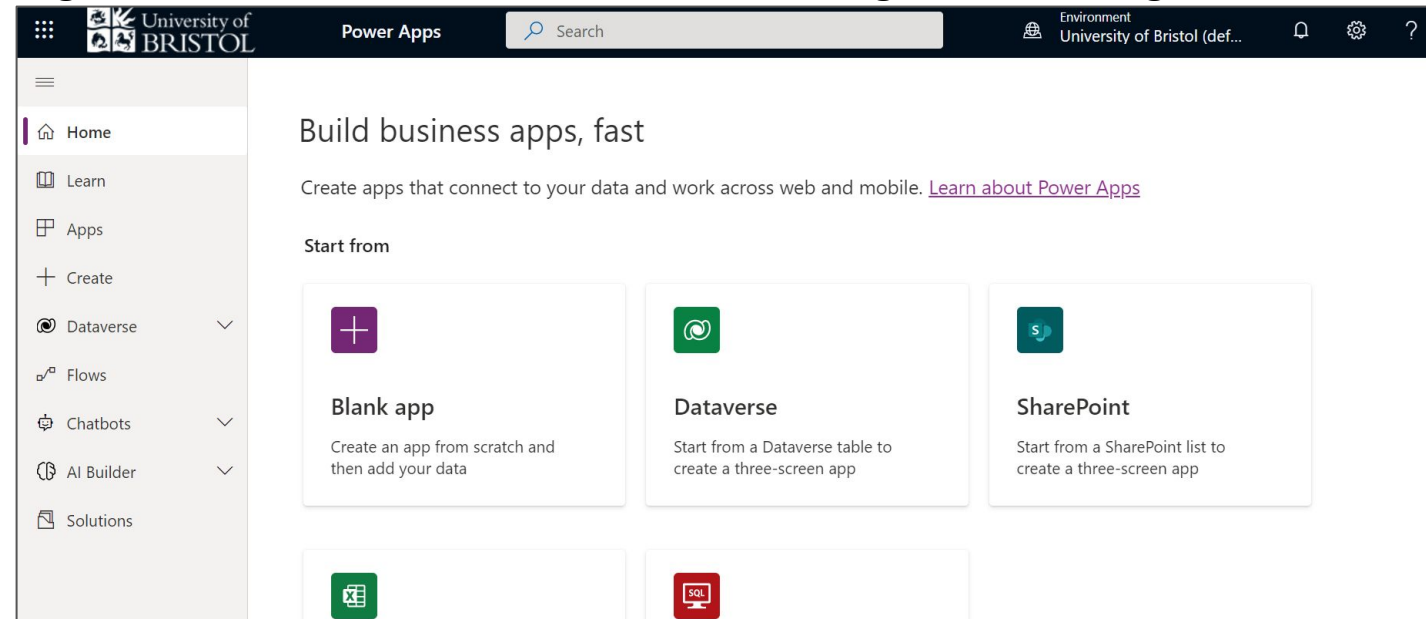


Figure 2: The Microsoft Power Apps home page

2. Prepare your digital environment – Excel

- I. Create a Teams Group on your Microsoft Teams account that uses your Bristol email address and name it “Twilio Workshop”
- I. Within this group create your own Excel workbook and name it anything you want – I would recommend going with your name e.g. “Twilio Jehan”
- I. Create a table within your workbook by going to the **Insert** tab, highlighting four cells (Figure

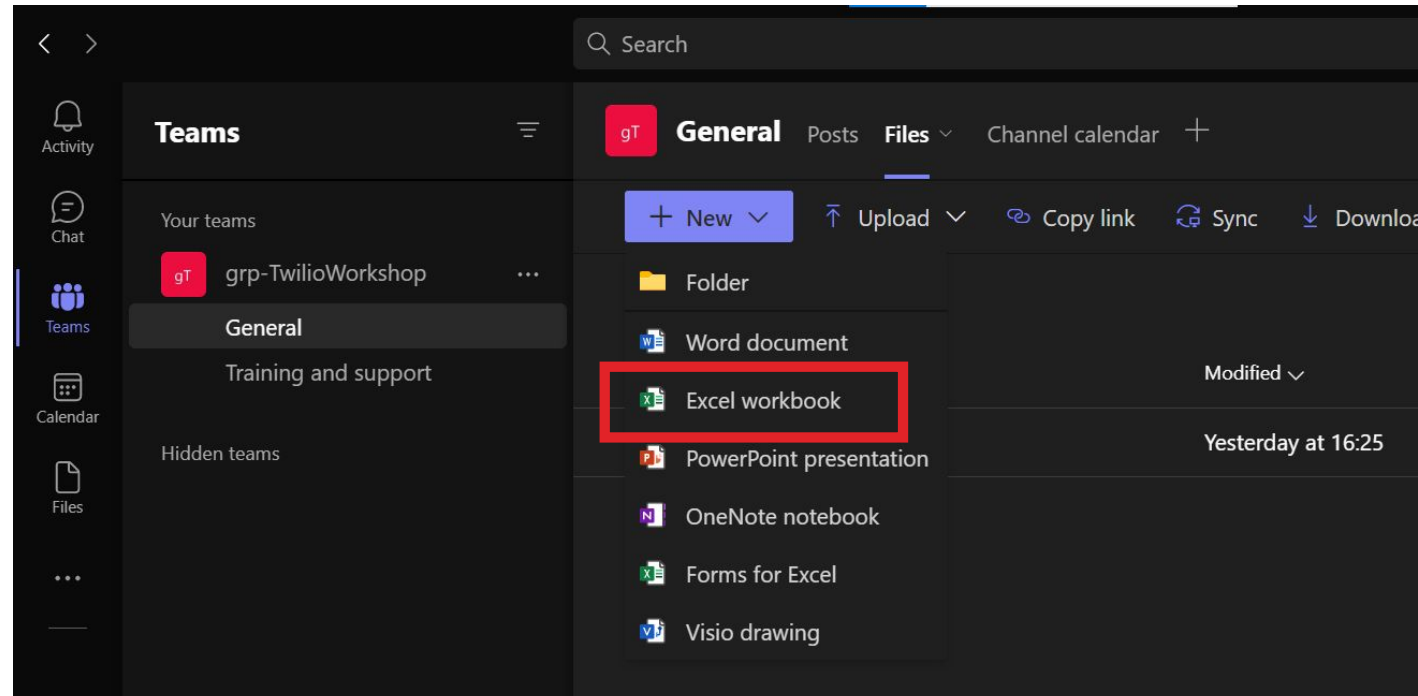


Figure 1: Highlighting the creation of a new Excel workbook in Teams.

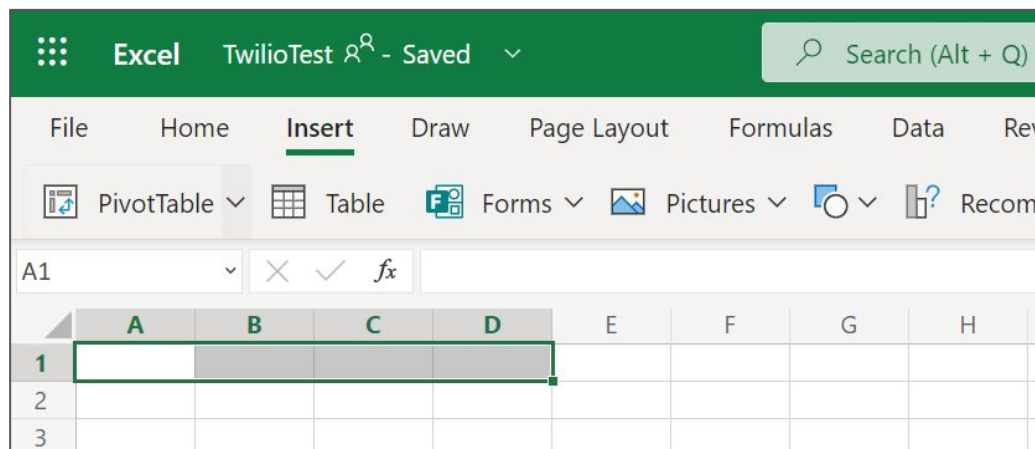


Figure 2: Highlighting the selection of four cells

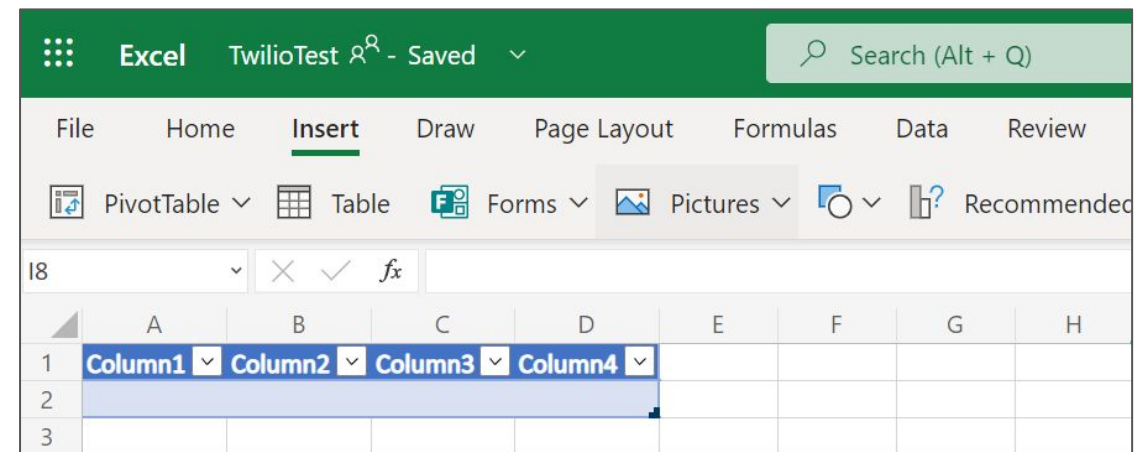


Figure 3: Displaying a newly created table

2. Prepare your digital environment – Excel

- IV. You should now have a table with four columns. The names of these columns can be changed to 'From', 'To', 'Message', 'Date'. You should now have the setup shown in Figure 1.

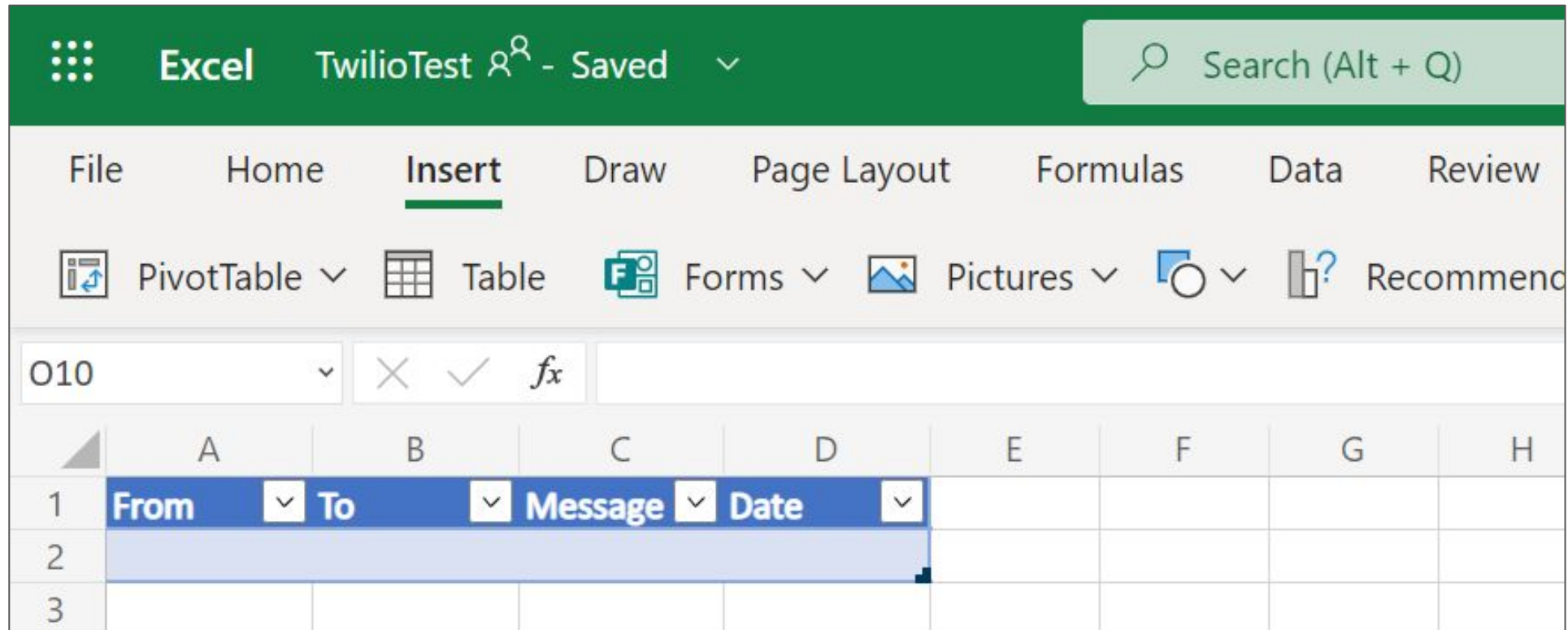


Figure 1: The final configuration of your table with the four column headings in order: From, To, Message, and Date.

3. Send a scheduled message

- I. Click create from the left navigation panel and select the **Instant cloud flow** trigger (Figure 2). We are going to select instant for now to minimize what could go wrong.
- I. On the pop up enter the flow name as “Send a Twilio Message”, select the “Manually trigger a flow” option and click create (Figure 1).

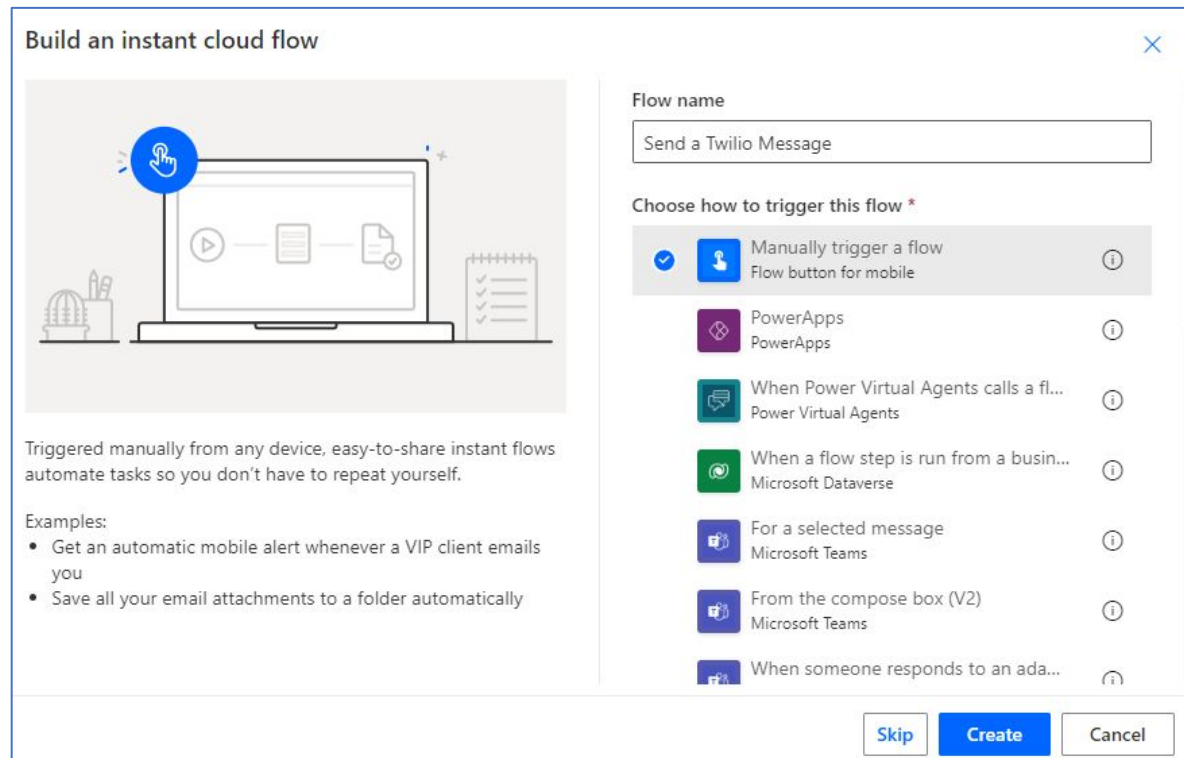


Figure 1: Creating the first flow with the name ‘Send a Twilio Message’ and selecting the Manually trigger a flow trigger option.

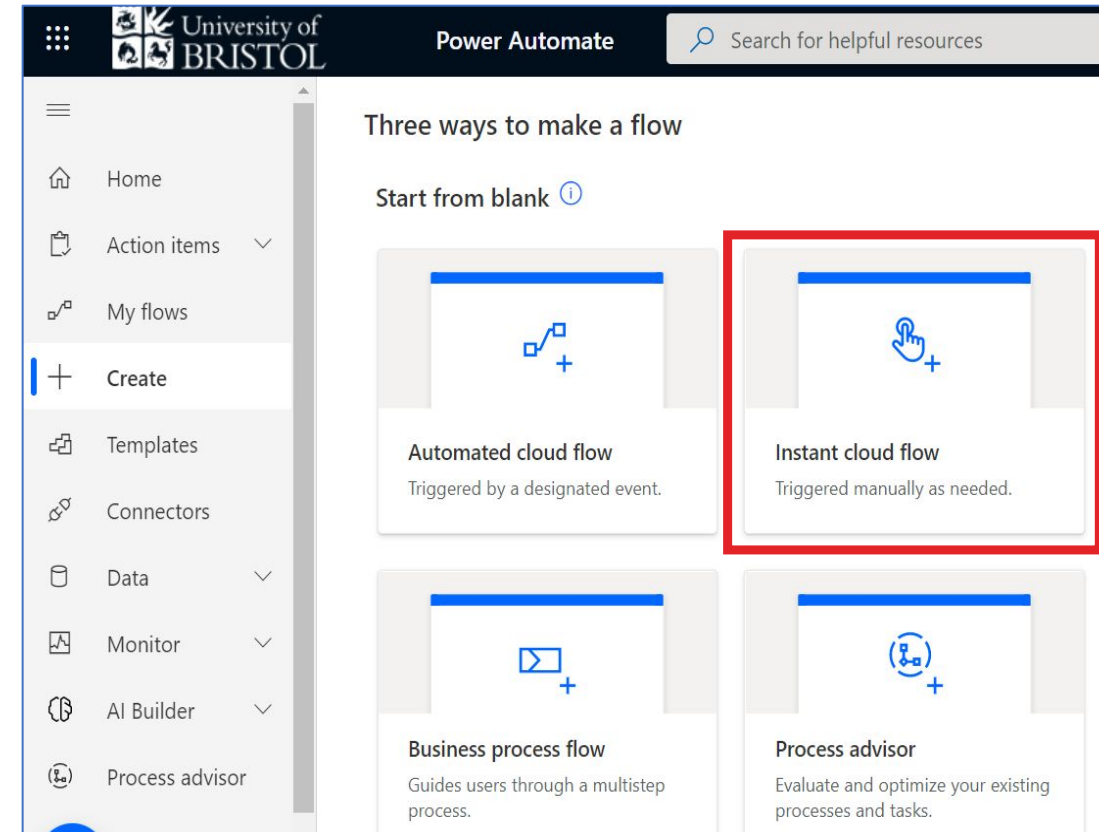


Figure 2: The highlight of the Instant cloud flow template within the Create tab.

4. Store your messages

- I. Now its time to connect your storage on Excel. As we don't necessarily want to tie this storage to the trigger message, we will create a new flow. To do this click the Create tab (Figure 3).
- I. Select the Instant cloud flow (Figure 1) to create a new flow titled "Save Twilio messages" (Figure 2)

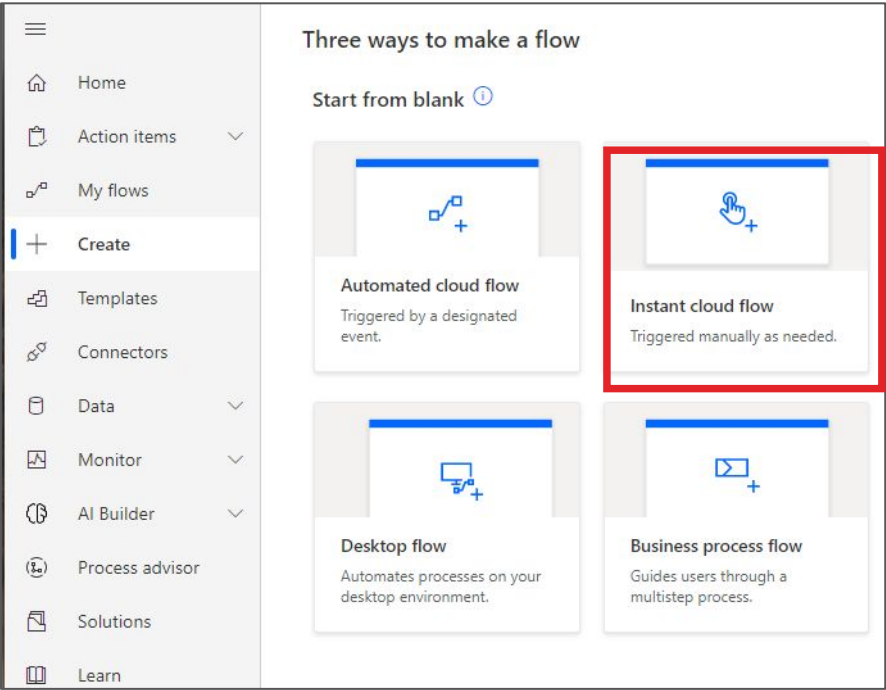


Figure 1: Highlighting the Instant cloud flow template

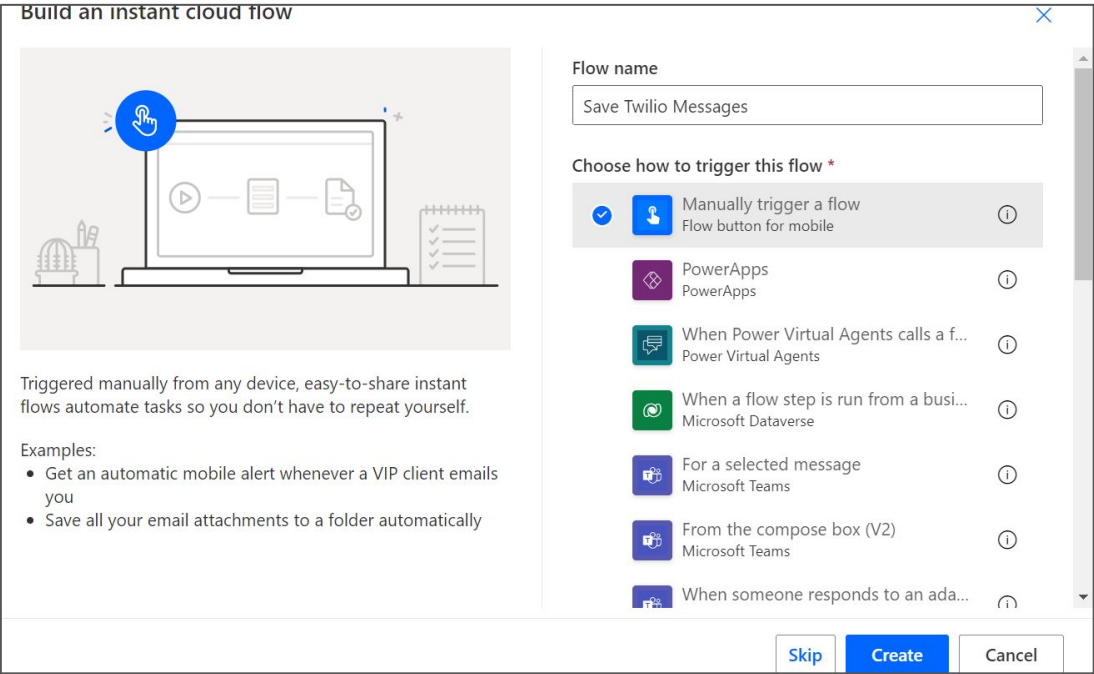


Figure 2: A new flow creation configuration with the title Save Twilio Messages and the Manual trigger.

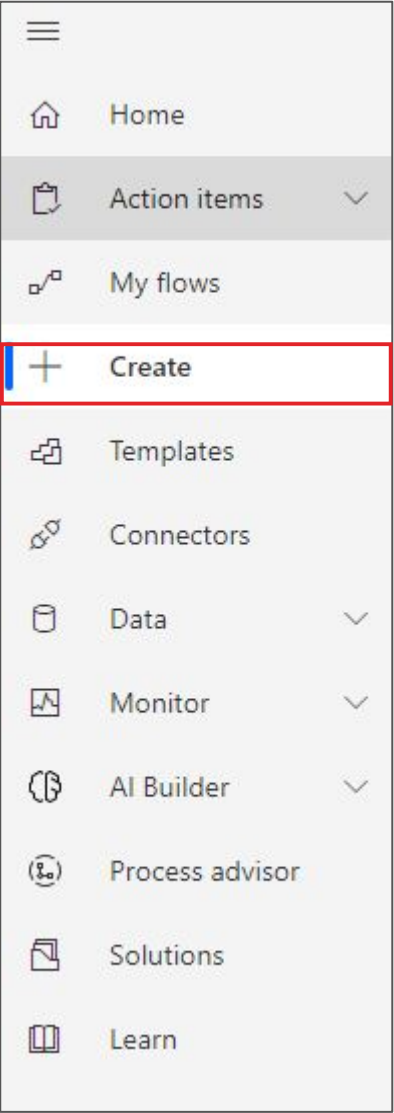
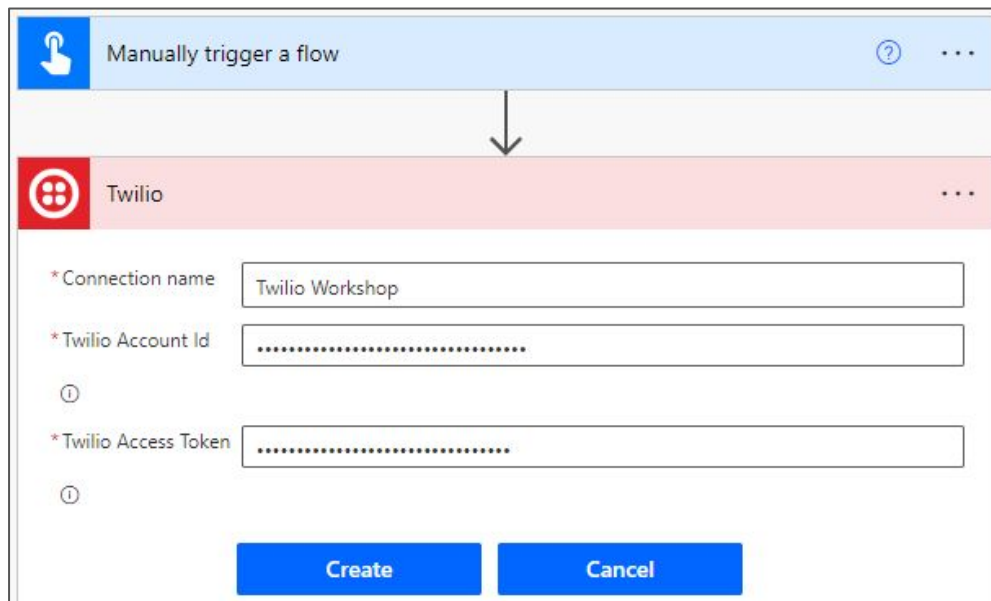


Figure 3: Highlighting the Create tab.

4. Store your messages

- III. You should be on a fresh flow with only the trigger. Add in a new action by searching for Twilio and selecting the List Messages action (Figure 2).
- III. You will need to setup the connection using the previously provided account details (Figure 1).
- Connection name:** Twilio workshop (Not required)
 - Account SID:** [YOUR ACCOUNT SID]
 - Auth Token:** [YOUR AUTH TOKEN]



The screenshot shows a 'Manually trigger a flow' window with a Twilio connection configuration form. The form has three input fields: 'Connection name' with the value 'Twilio Workshop', 'Twilio Account Id' with a masked value, and 'Twilio Access Token' with a masked value. There are 'Create' and 'Cancel' buttons at the bottom.

Figure 1: The current flow with the Twilio connection config details being setup.

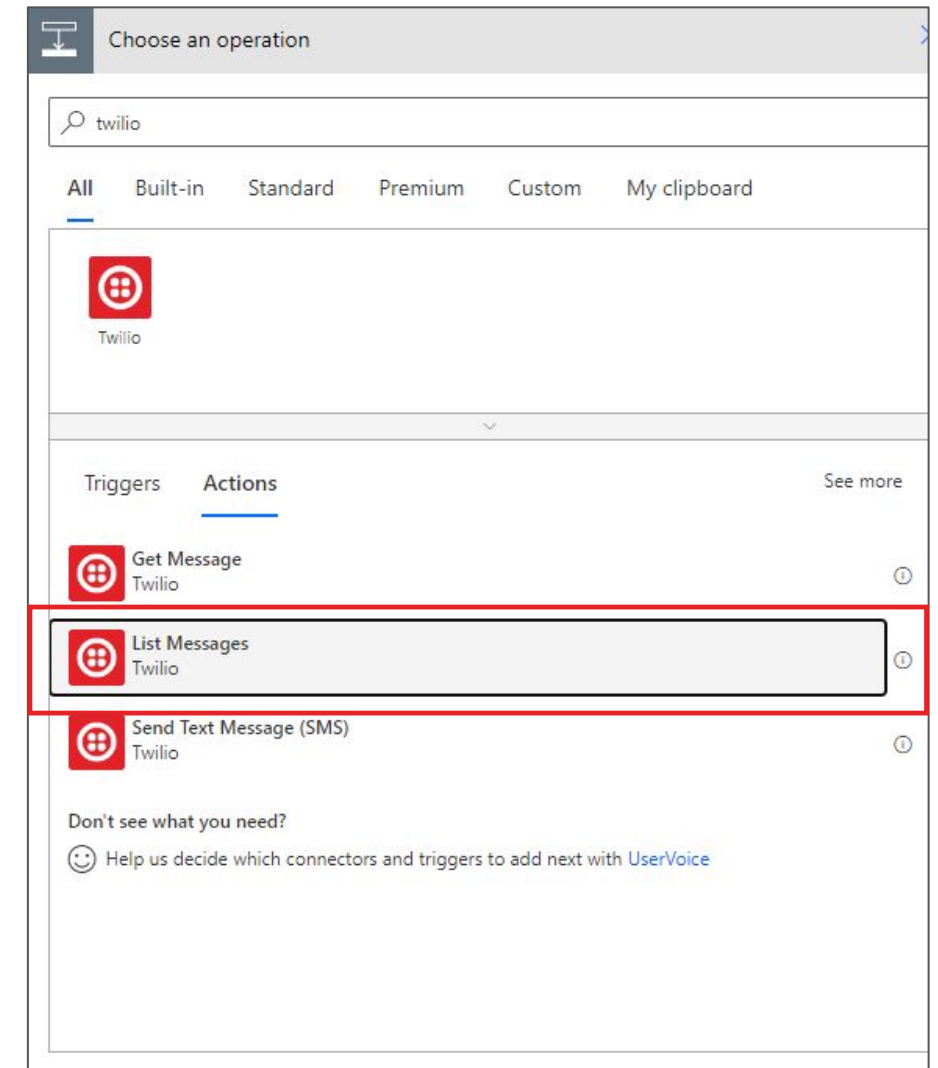
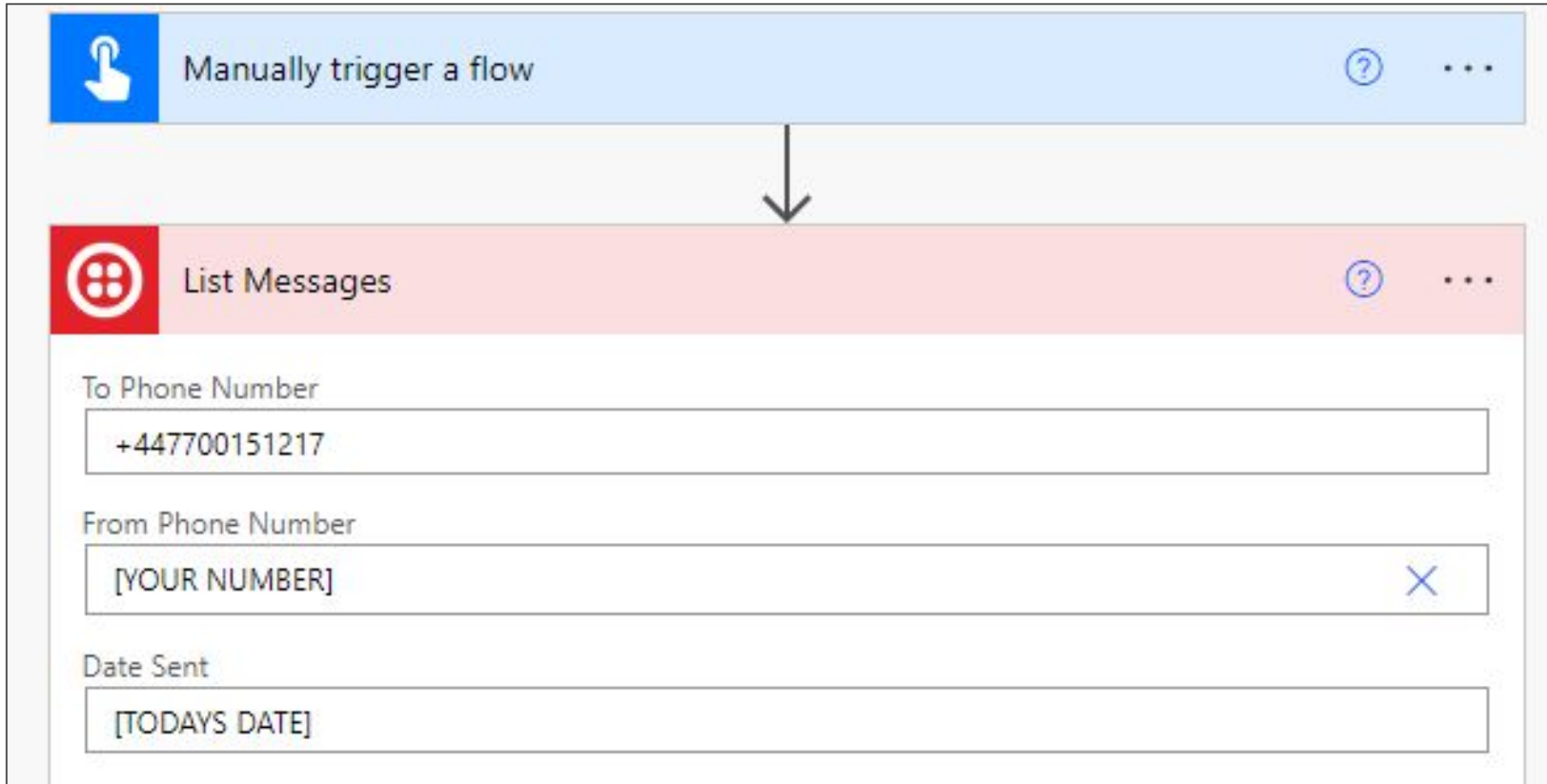


Figure 2: Showing the choose an operation pop up and selecting the List Messages Twilio action.

4. Store your messages

- V. Fill in the List Messages action block with:
- Your Twilio phone number: +44XXXXXXXXXX
 - Your phone number (in +44 format)
 - Today's date in YYYY-MM-DD format.

This collects all the messages being sent from your number to your Twilio number from Today. To change what date you would like to collect messages from, just change the date and run the flow! To get the messages from your Twilio number to your phone you would need to swap around the order. To change the phone number you'd like to collect the messages from, just change the phone number and run the flow again.



The screenshot shows a Twilio Studio flow configuration. At the top is a blue block labeled 'Manually trigger a flow'. An arrow points down to a red block labeled 'List Messages'. Below the 'List Messages' block, there are three input fields: 'To Phone Number' with the value '+447700151217', 'From Phone Number' with the placeholder '[YOUR NUMBER]', and 'Date Sent' with the placeholder '[TODAYS DATE]'. Each input field has a small 'X' icon to its right for clearing the text. The 'List Messages' block itself has a question mark icon and a three-dot menu icon on its right side.

Figure 1: The configuration information for the Twilio List Messages action.

4. Store your messages

- VI. Add in the apply to each action by clicking next step, searching for it then clicking the block that matches the name (Figure 1).
- VI. When you click on the select an output from the previous steps parameter select the 'Message List messages' value to add it to the box (Figure 2).

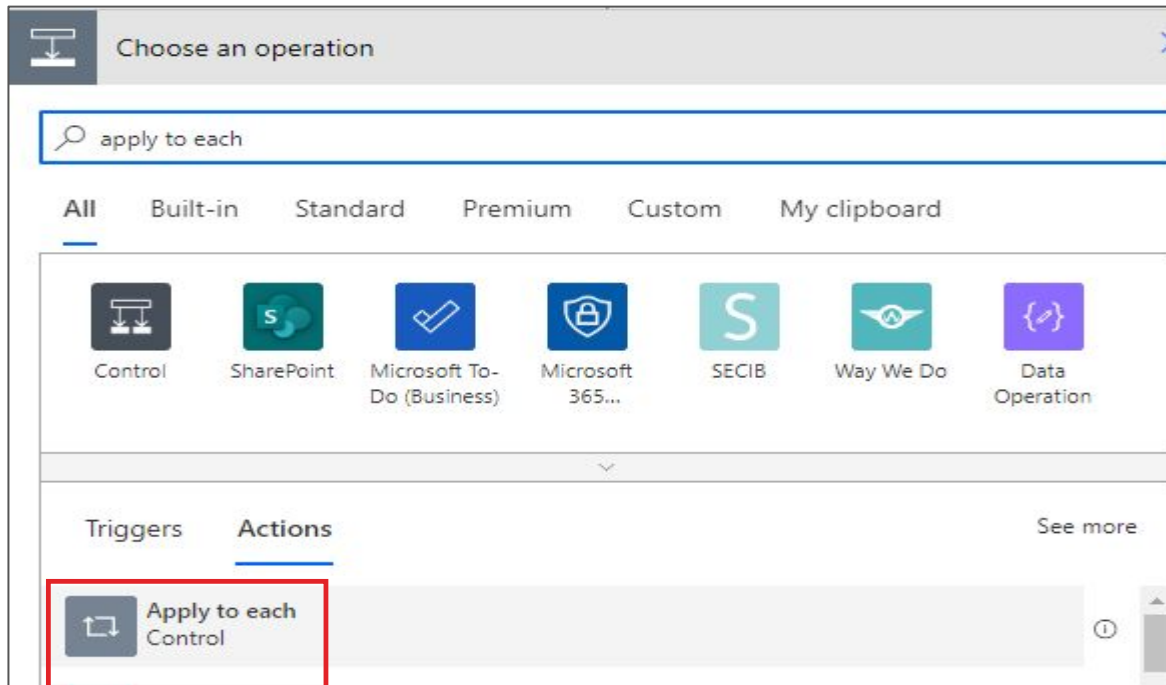


Figure 1: Showing the Choose an operation window with the selection of the apply to each action.

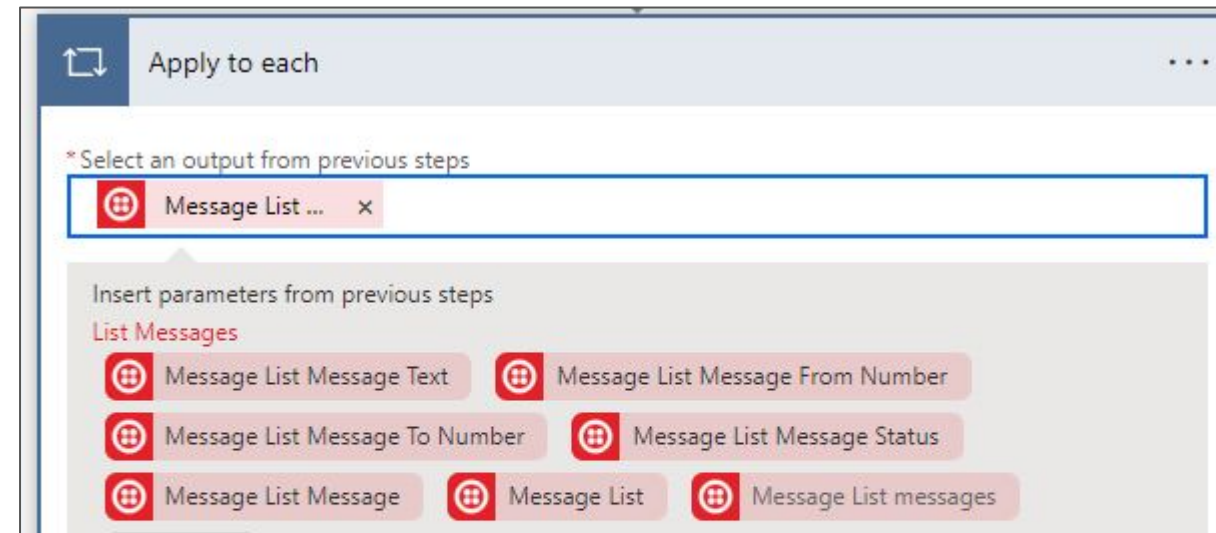


Figure 2: The configuration of the Apply to each action block.

4. Store your messages

- VIII. At the bottom of the Apply to each block there is an add action within it (Figure 1). By having the add an action within this block it allows the function to loop and apply the same function to each message in our list.
- VIII. Add the 'Add a row into a table' action to the apply to each block (Figure 2).

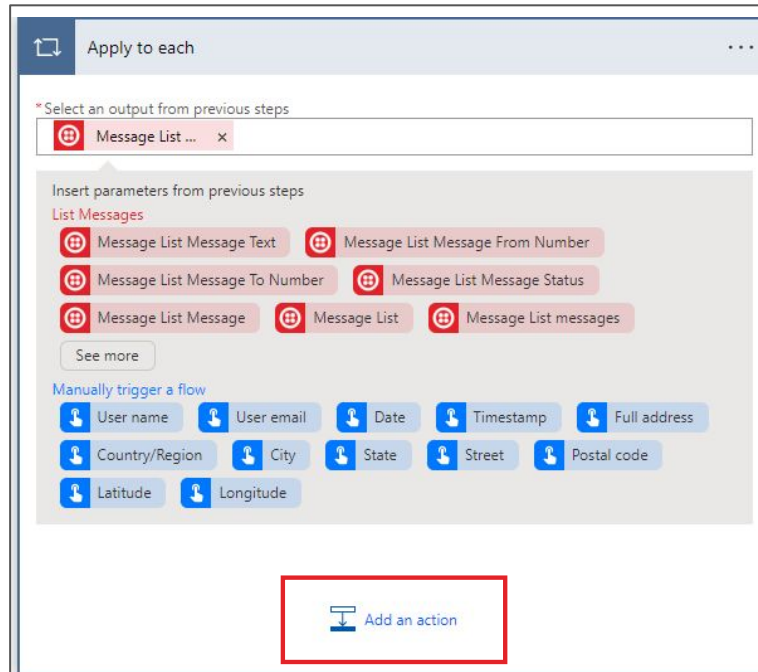
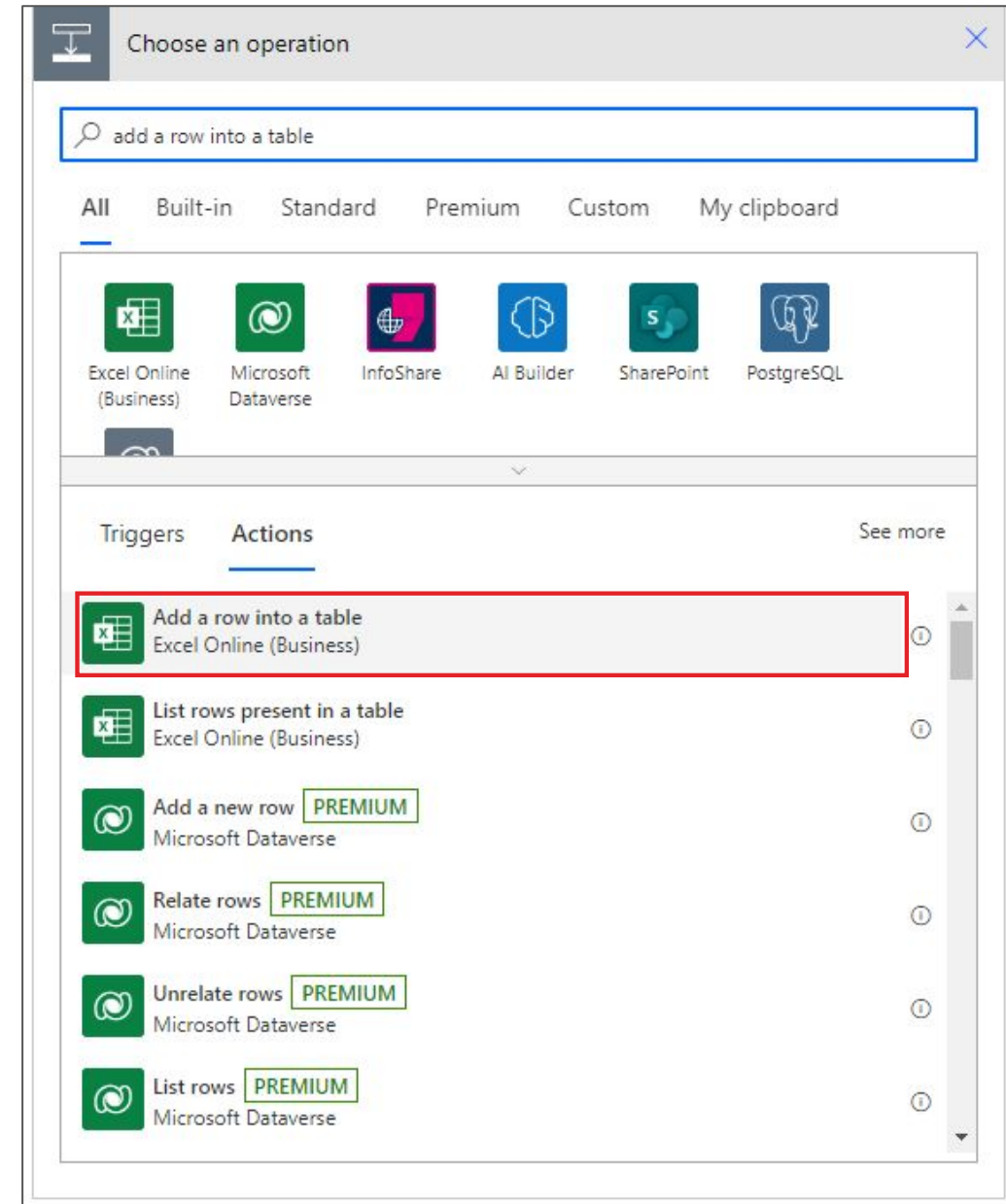


Figure 1: Highlighting the add an action button within the Apply to each action.

Figure 2: Showing the Choose an operation window and selecting the Add a row into a table action.



4. Store your messages

- X. At this stage select the group you made on Teams and the specific table you created within the excel sheet.
- X. For the specific table entries use:
 - a. **From:** Message List Message From Number
 - b. **To:** Message List Message To Number
 - c. **Message:** Message List Message Text
 - d. **Data:** Message List Message Send Date-Time
- XI. You should now be able to run your new flow with the Test button. It takes a bit of time for it to run so you may need to refresh your excel sheet a couple of times.

Figure 1: The configuration of the Add a row into a table action block.

The screenshot shows the configuration for the 'Add a row into a table' action block. The block is titled 'Add a row into a table' and has a green header bar. Below the header, there are several configuration fields:

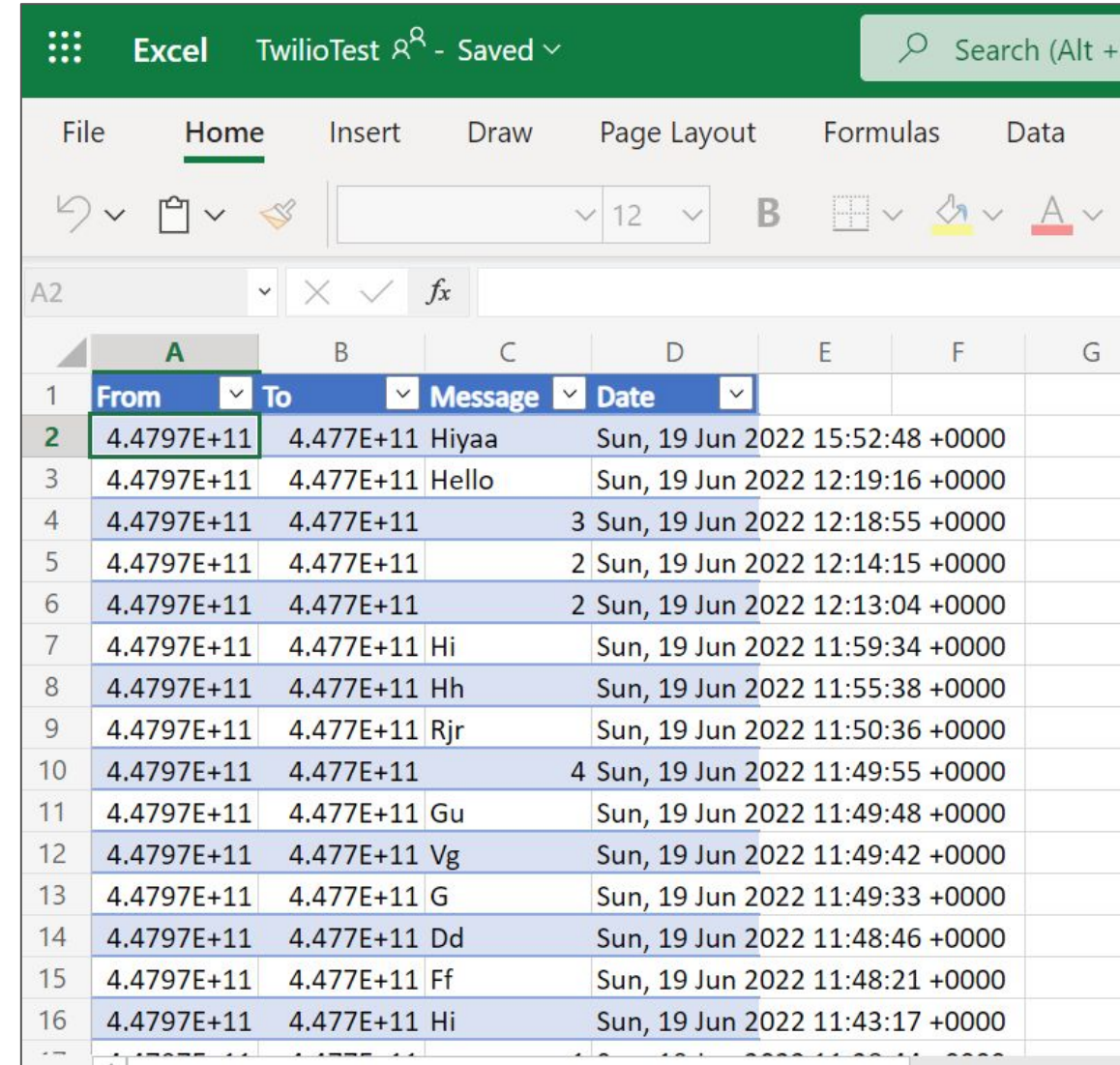
- * Select an output from previous steps:** A dropdown menu showing 'Message List ...' with a red icon and a close button.
- * Location:** A dropdown menu showing 'Group - grp-TwilioWorkshop' with a blue checkmark.
- * Document Library:** A dropdown menu showing 'Documents' with a blue checkmark.
- * File:** A text input field showing '/General/TwilioTest.xlsx' with a folder icon.
- * Table:** A dropdown menu showing 'Table3' with a blue checkmark.
- DateTime Format:** A dropdown menu showing 'DateTime Format.' with a blue checkmark.
- From:** A dropdown menu showing 'Message List ...' with a red icon and a close button.
- To:** A dropdown menu showing 'Message List ...' with a red icon and a close button.
- Message:** A dropdown menu showing 'Message List ...' with a red icon and a close button.
- Date:** A dropdown menu showing 'Message List ...' with a red icon and a close button.

At the bottom, there is a link 'Hide advanced options' with an upward arrow icon.

4. Store your messages

XIII. You should now be able to see your table fill up with some meaningful data!

Small note: If you run the collect messages multiple times you will get duplicates as the system you have created has no memory/access to the data you already have – so it won't just fill in the gaps. To ensure that messages are scheduled for the correct number of times, ensure that there are no duplicates before running the code in the follow sections.



	A	B	C	D	E	F	G
1	From	To	Message	Date			
2	4.4797E+11	4.477E+11	Hiyaa	Sun, 19 Jun 2022 15:52:48 +0000			
3	4.4797E+11	4.477E+11	Hello	Sun, 19 Jun 2022 12:19:16 +0000			
4	4.4797E+11	4.477E+11		3 Sun, 19 Jun 2022 12:18:55 +0000			
5	4.4797E+11	4.477E+11		2 Sun, 19 Jun 2022 12:14:15 +0000			
6	4.4797E+11	4.477E+11		2 Sun, 19 Jun 2022 12:13:04 +0000			
7	4.4797E+11	4.477E+11	Hi	Sun, 19 Jun 2022 11:59:34 +0000			
8	4.4797E+11	4.477E+11	Hh	Sun, 19 Jun 2022 11:55:38 +0000			
9	4.4797E+11	4.477E+11	Rjr	Sun, 19 Jun 2022 11:50:36 +0000			
10	4.4797E+11	4.477E+11		4 Sun, 19 Jun 2022 11:49:55 +0000			
11	4.4797E+11	4.477E+11	Gu	Sun, 19 Jun 2022 11:49:48 +0000			
12	4.4797E+11	4.477E+11	Vg	Sun, 19 Jun 2022 11:49:42 +0000			
13	4.4797E+11	4.477E+11	G	Sun, 19 Jun 2022 11:49:33 +0000			
14	4.4797E+11	4.477E+11	Dd	Sun, 19 Jun 2022 11:48:46 +0000			
15	4.4797E+11	4.477E+11	Ff	Sun, 19 Jun 2022 11:48:21 +0000			
16	4.4797E+11	4.477E+11	Hi	Sun, 19 Jun 2022 11:43:17 +0000			

Figure 1: The excel table being filled by the data from your Power Automate request.

I. It's now time to start setting up an automated messaging schedule for all the participants in your study. The first thing you need to do is download the final spreadsheet that you created on Teams, which has been populated with all information you need.

I. You then need to move this file into your Twilio folder and name it "tester.xlsx". Your Twilio folder should now look like figure 1

I. Open your tester.xlsx and ensure that "From" is in column A and "Message" is in column C"

I. You will now need to edit some code in **schedule.js**

I. Open the file and on line X you will see the following code

```
var phoneNumber = worksheet[`A${i}`].v;  
var numberOfTimes = worksheet[`C${i}`].v;
```

This says that the phone number will be read from column A and the number of time they would like to be contacted will be taken from column C

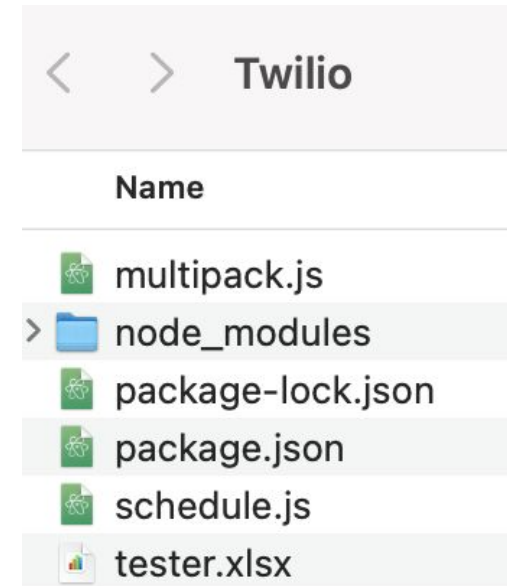


figure 1: Twilio folder

I. Now go to line X and you will see this code:

```
for(let i=2; i < 7; i++){
```

1. Replace 7 with the number of entries that you have in your excel sheet (not including row 1) +
2. So if you have 30 entries in your spreadsheet, replace 7 with 32.

I. Then go ahead and save the file

I. Open a terminal → navigate to you twilio folder → type: node schedule.js → press enter.

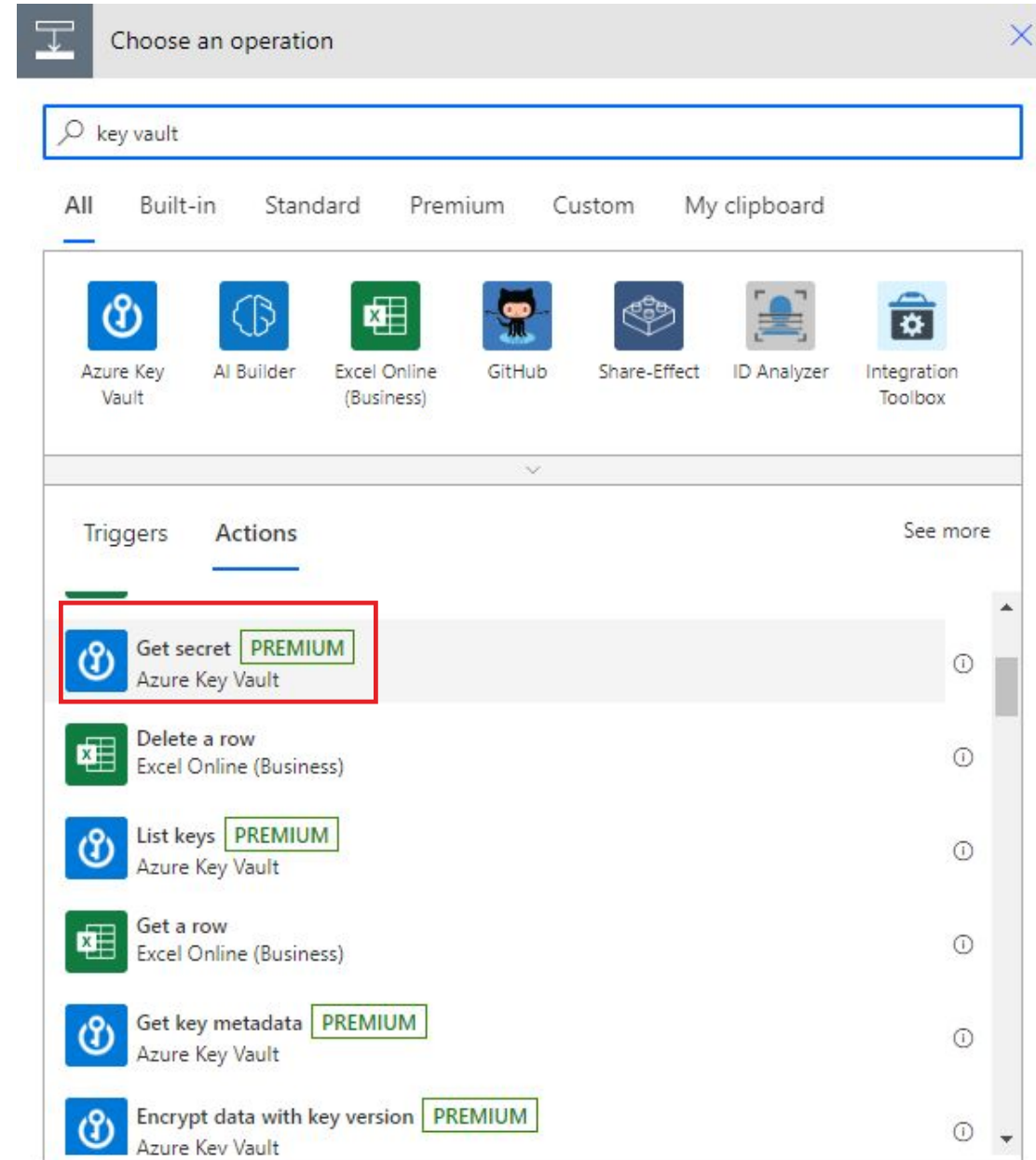
You have now scheduled some message and should see text on the terminal which tells you the phone number the messages have been scheduled for and the SID of all the messages

Azure Key Vault

If you want to use Power Automate with real data, you will need to find a way to securely store your Twilio access tokens (Account SID & Authentication Token).

Azure Key Vault is an example of an easy way to do this – as it has been designed to integrate with Power Automate via the **Get secret** action (Figure 1).

The other benefit of using Azure Key Vault is that its **cheap**. The pricing of AKV is designed for operations that require its services frequently. In comparison when using the system in EMA context you really aren't using it that much. For example, you probably will only need up to ten accesses a day with EMA. The pricing of AKV is \$0.03/ 10,000 highlighting that this service is essentially free for the little guys like us!



Terms Cheat Sheet - Twilio

Term	Definition
Twilio Phone Number	A Twilio Phone Number is the ownership of a specific number which can be controlled virtually via Twilio
Twilio Flow	Is the name to describe the logical workflow 'your program' that can be generated in Studio.
Twilio Studio	Is the online platform which allows the use of functional blocks 'widgets' to generate logic flows to replace the need for programming.
Console	The console of your Twilio account is a term used to describe the home point for all the different functionality Twilio offers.
Widget	A widget is a tool/block that Twilio provides to replace a specific function which would normally need to be generated via a programming language.
Messaging service SID	Meaning the messaging services' String ID entifier which is used to keep track of the messaging services you use in Twilio. For example, you will have separate messaging services for notifying users about appointments and another to survey users about their experience that you will need to be able to uniquely identify each.
Account SID	Is your unique String ID entifier which relates specifically to the account.
Authentication Token	This token is connected directly to your account SID and can be used in combination with it to gain access to the functionality of your Twilio account. It is essentially just a second step of protection to ensure that you are who you say you are.

Terms Cheat Sheet -

Term	Definition
Protocol	In the context of computer science, a protocol relates to the set of rules which govern how data can be sent and therefore how it can then be understood.
HTTP Request	HTTP is a specific protocol (Hypertext Transfer Protocol) used for the communication of information over the web. HTTP request therefore relates to a request for some action to be performed.
API	API stands for an Application Programming Interface. Essentially programmers don't want you to be able to access the innards of their application so instead they develop a front of house that you can interact. The interfaces will consist of pre-built functions that the application already knows how to deal with and therefore you can interact with an application without needing all of the code.
REST API	There is a specific interface called REST which stands for RE presentational State Transfer . REST is a methodology which provides another set of standards for how data should be transmitted over the web. When combined with API, this just means you are using a specifically designed API which allows uniformity for network communication across the web!