Midterm Report
Create serverless applications

10727211 林彥輝
10727216 李品毅

Intro

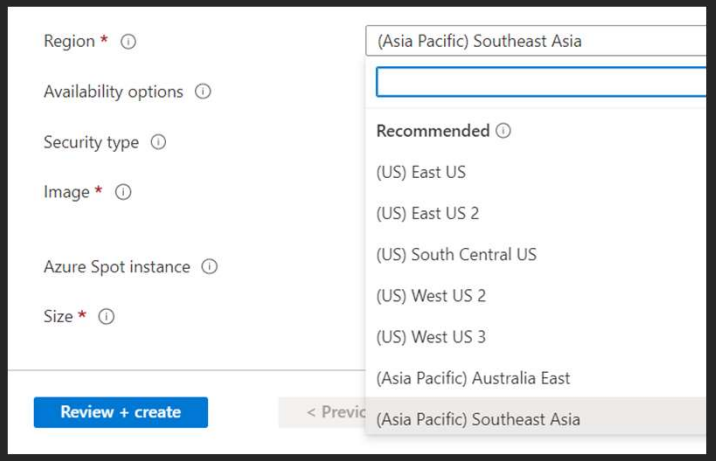
Model	1	2	3	4	5	6	7	8	9	10	11
Sandbox	Intro										Local
110-1-CS456L	Intro										Local
							VS (with lib)	Github	Node.js Core Tools VS Code (with lib)		Golang Azurite extension
Exercise		2	2	2	2	2	2	2	2	2	2
Schedule	80min (Hands-on)						10min (Intro)				

Azure Portal (110-1-CS456L)：https://portal.azure.com/#home

Microsoft Learn：https://docs.microsoft.com/en-us/learn/paths/create-serverless-applications/

Intro

- 本報告279頁，請把PPT載下來對照（台上只講大流程）



- Region （不要通通集中在Japan East）
- Resource Naming Rule（記得學號開頭）
- 備忘稿要看，裡面有提醒（有code、截圖提示！）

- Another Resource：https://www.youtube.com/playlist?list=PLMXvlcTmSbxHVQ2pUfZkgyu_0mum7jiKH

  Sandbox Demo Video （Model 2 3 4 5 6 8 ，~103min）

01 Choose the best Azure service to automate your business processes

Azure Functions

https://docs.microsoft.com/en-us/learn/modules/create-serverless-logic-with-azure-functions/2-decide-if-serverless-computing-is-right-for-your-business-need

https://docs.microsoft.com/en-us/learn/modules/build-serverless-api-with-functions-api-management/2-import-function-app-api-management

What is serverless compute?

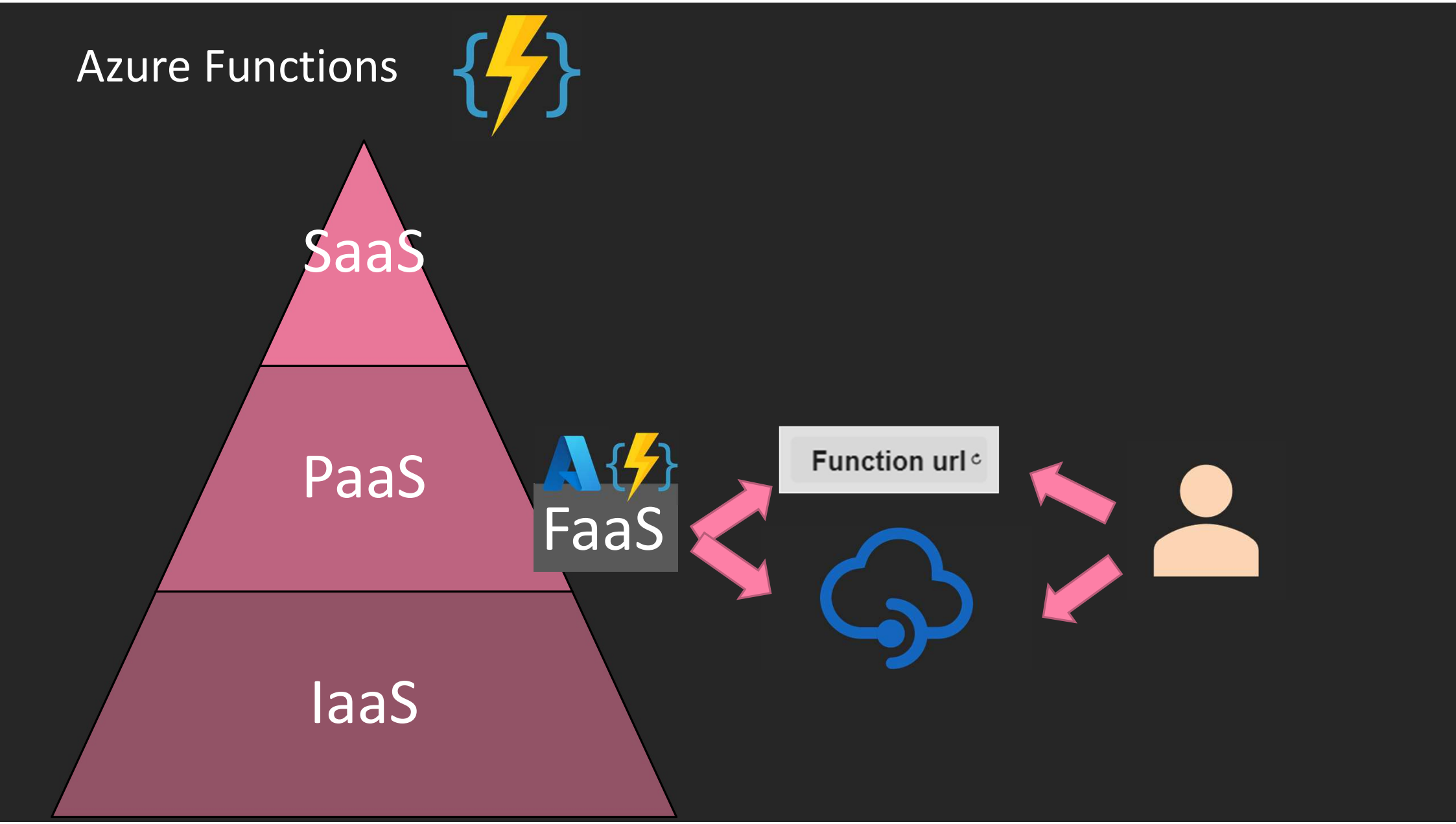
Serverless compute can be thought of as a function as a service (FaaS), or a microservice that is hosted on a cloud platform. You don't have to manually provision or scale infrastructure. The cloud provider manages infrastructure. Your app is automatically scaled out or down depending on load.

What is Azure Functions?

Azure Functions is a service that enables serverless architectures in Azure. You can write functions, without worrying about the supporting infrastructure, in many different languages, including C#, Java, JavaScript, PowerShell, and Python. You can also use libraries from NuGet and the Node Package Manager (NPM), and authenticate users with the OAuth standard from providers such as Active Directory, Facebook, Google, and Microsoft Account.

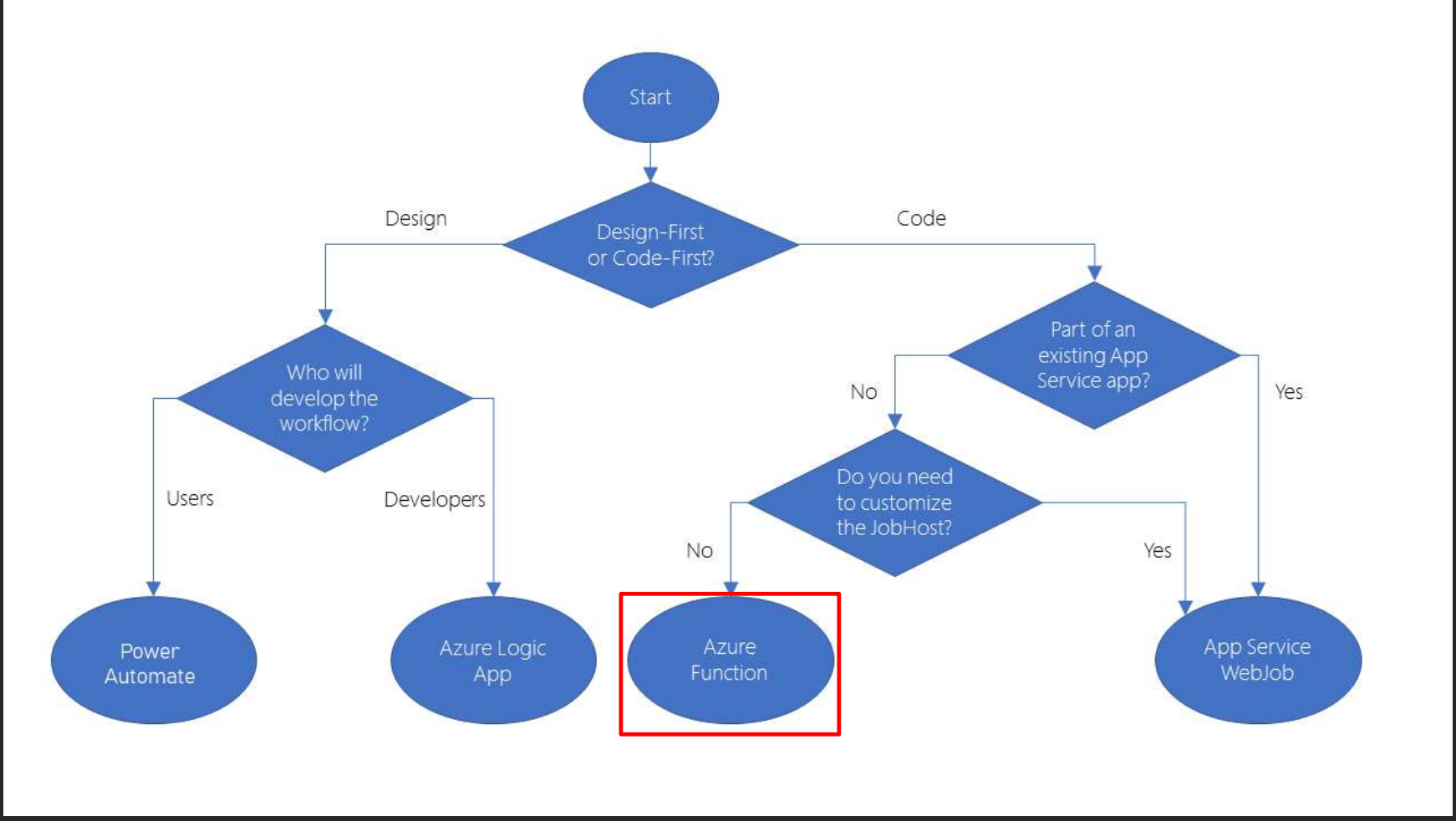
Benefits

1. Avoids over-allocation of infrastructure
2. Stateless logic
3. Event driven
4. Functions can be used in traditional compute environments


Azure Functions
SaaS
PaaS
IaaS
FaaS
Function url

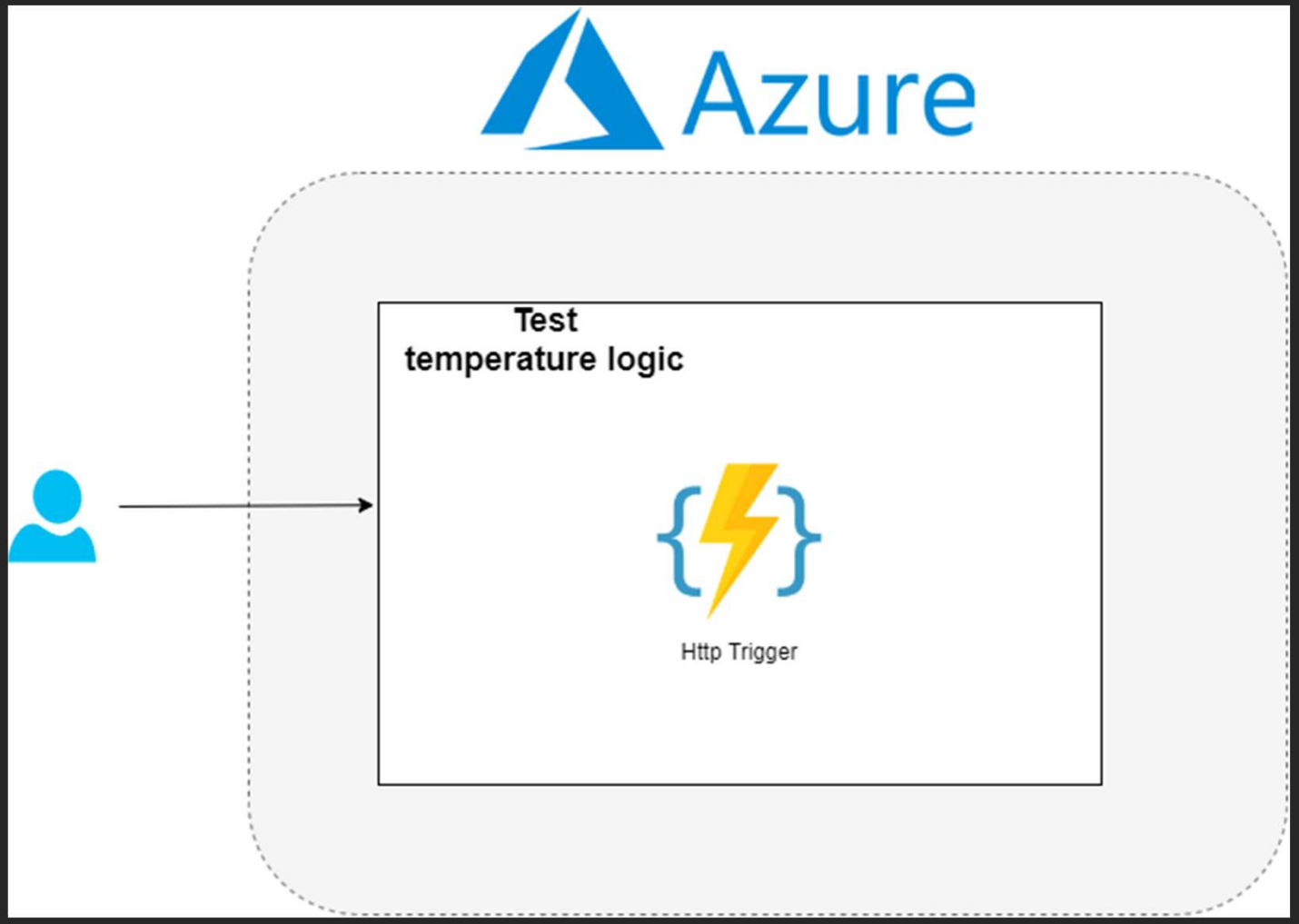
Choose a Azure Serverless Service

https://docs.microsoft.com/en-us/learn/modules/choose-azure-service-to-integrate-and-automate-business-processes/3-analyze-the-decision-criteria

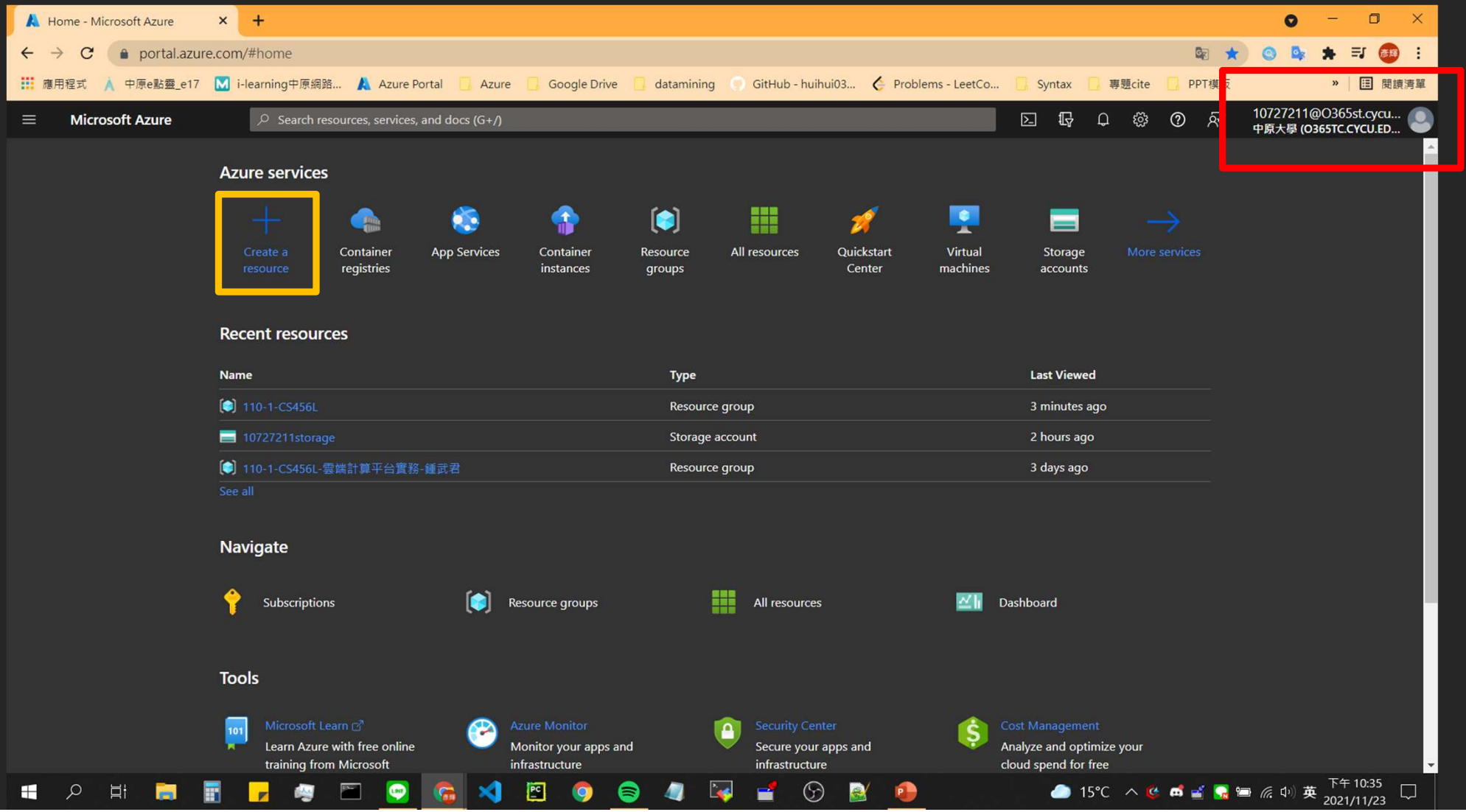


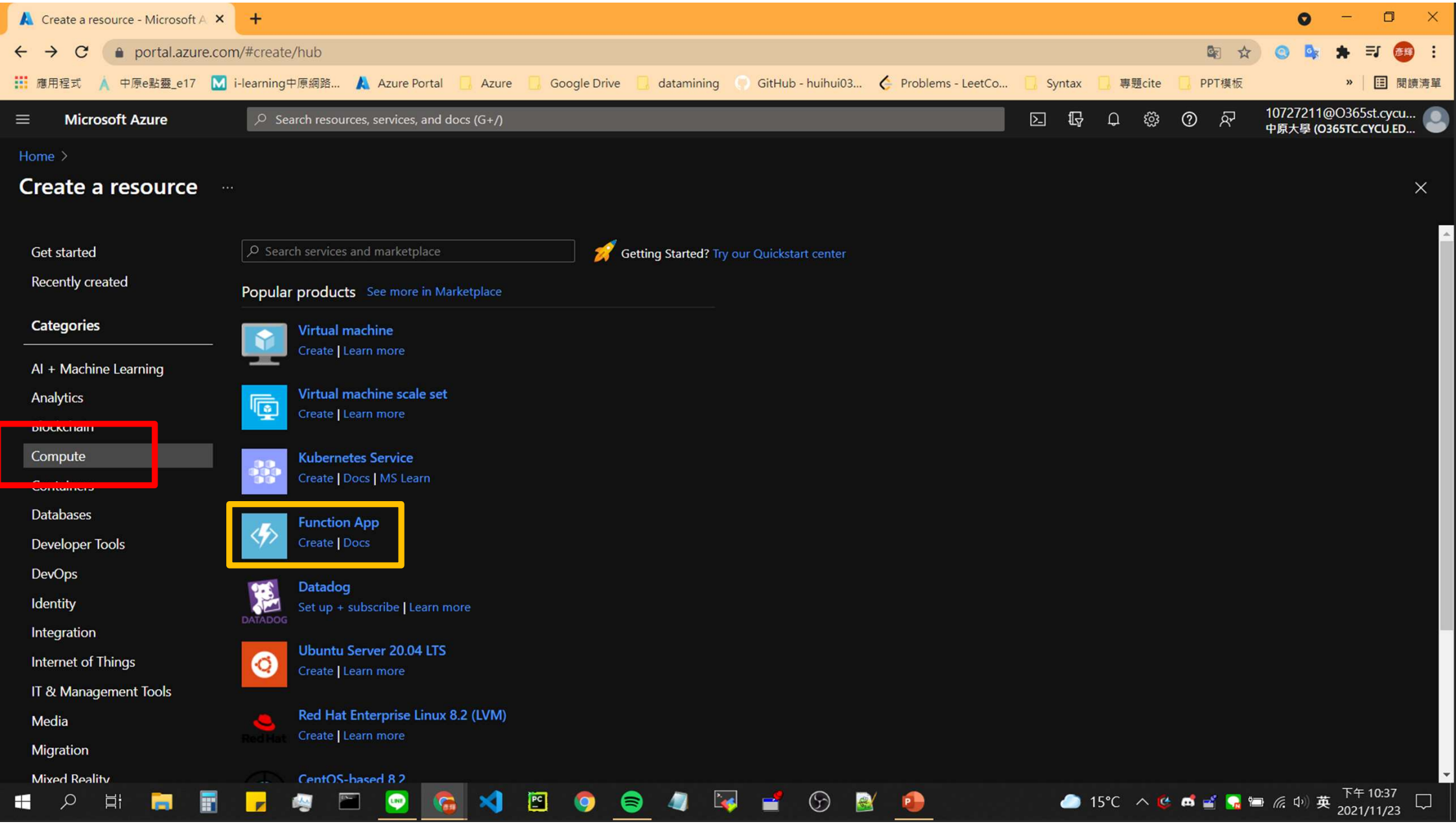
02 Create serverless logic with Azure Functions

Abstract



Create Azure Function in the Azure Portal

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Search services and marketplace
Getting Started? Try our Quickstart center
Popular products
See more in Marketplace
Virtual machine
Create | Learn more
Virtual machine scale set
Create | Learn more
Kubernetes Service
Create | Docs | MS Learn
Function App
Create | Docs
Datadog
Set up + subscribe | Learn more
Ubuntu Server 20.04 LTS
Create | Learn more
Red Hat Enterprise Linux 8.2 (LVM)
Create | Learn more
15°C
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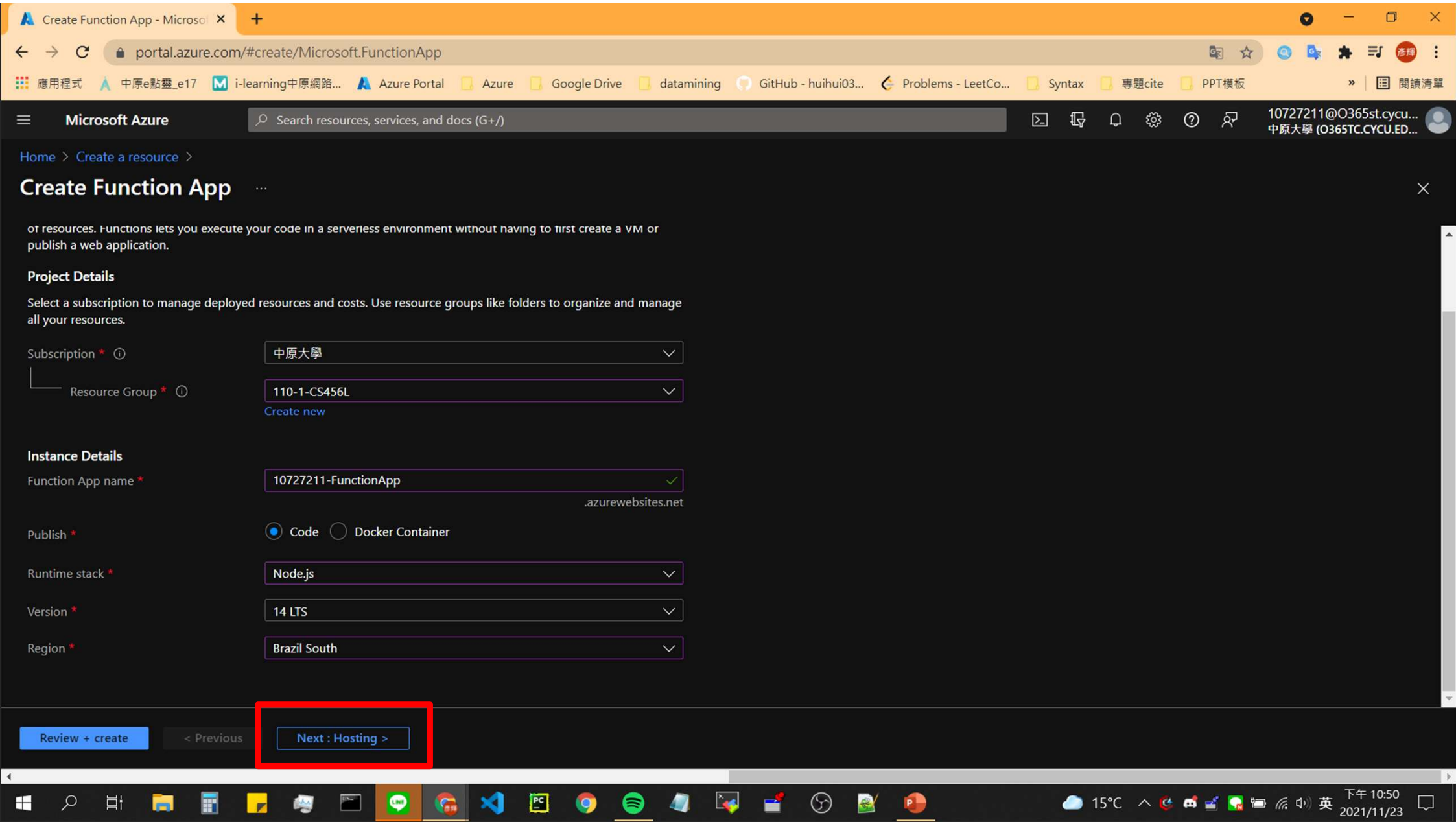
2021/11/23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Home > Create a resource >
Create Function App
of resources. Functions lets you execute your code in a serverless environment without having to first create a VM or publish a web application.
Project Details
Select a subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.
Subscription *
中原大學
Resource Group *
110-1-CS456L
Create new
Instance Details
Function App name *
10727211-FunctionApp
.azurewebsites.net
Publish *
Code
Docker Container
Runtime stack *
Node.js
Version *
14 LTS
Region *
Brazil South
Review + create
< Previous
Next : Hosting >
15°C
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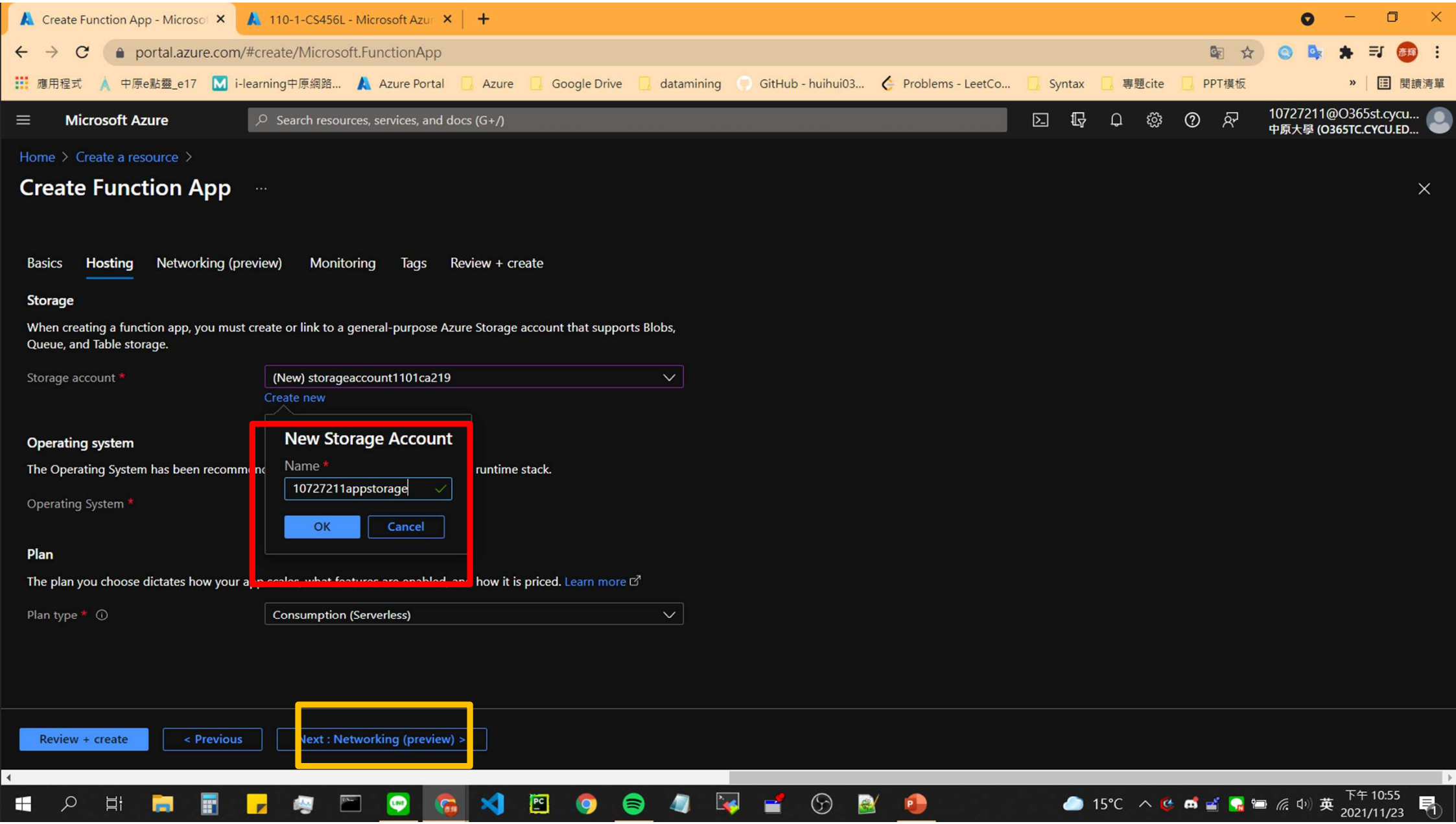
Create Function App - Microso
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portal.azure.com/#create/Microsoft.FunctionApp
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Problems - LeetCo...
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Create Function App
Basics
Hosting
Networking (preview)
Monitoring
Tags
Review + create
Storage
When creating a function app, you must create or link to a general-purpose Azure Storage account that supports Blobs, Queue, and Table storage.
Storage account *
(New) storageaccount1101ca219
Create new
New Storage Account
Name *
10727211appstorage
OK
Cancel
Operating system
runtime stack.
Operating System *
Plan
how it is priced. Learn more
Plan type *
Consumption (Serverless)
Review + create
< Previous
Next : Networking (preview) >
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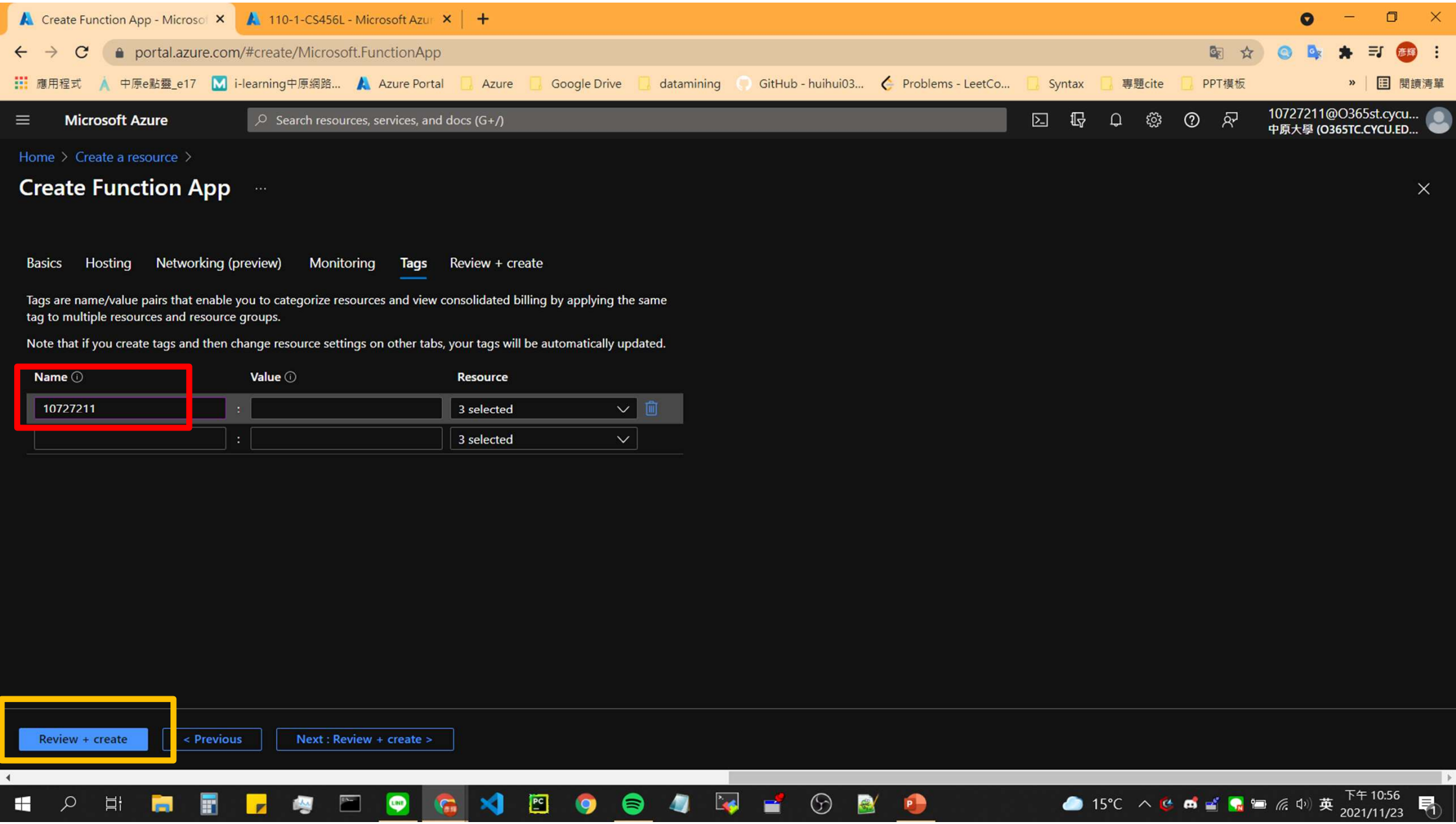
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Monitoring
Tags
Review + create
Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups.
Note that if you create tags and then change resource settings on other tabs, your tags will be automatically updated.
Name
Value
Resource
10727211
3 selected
3 selected
Review + create
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Next : Review + create >
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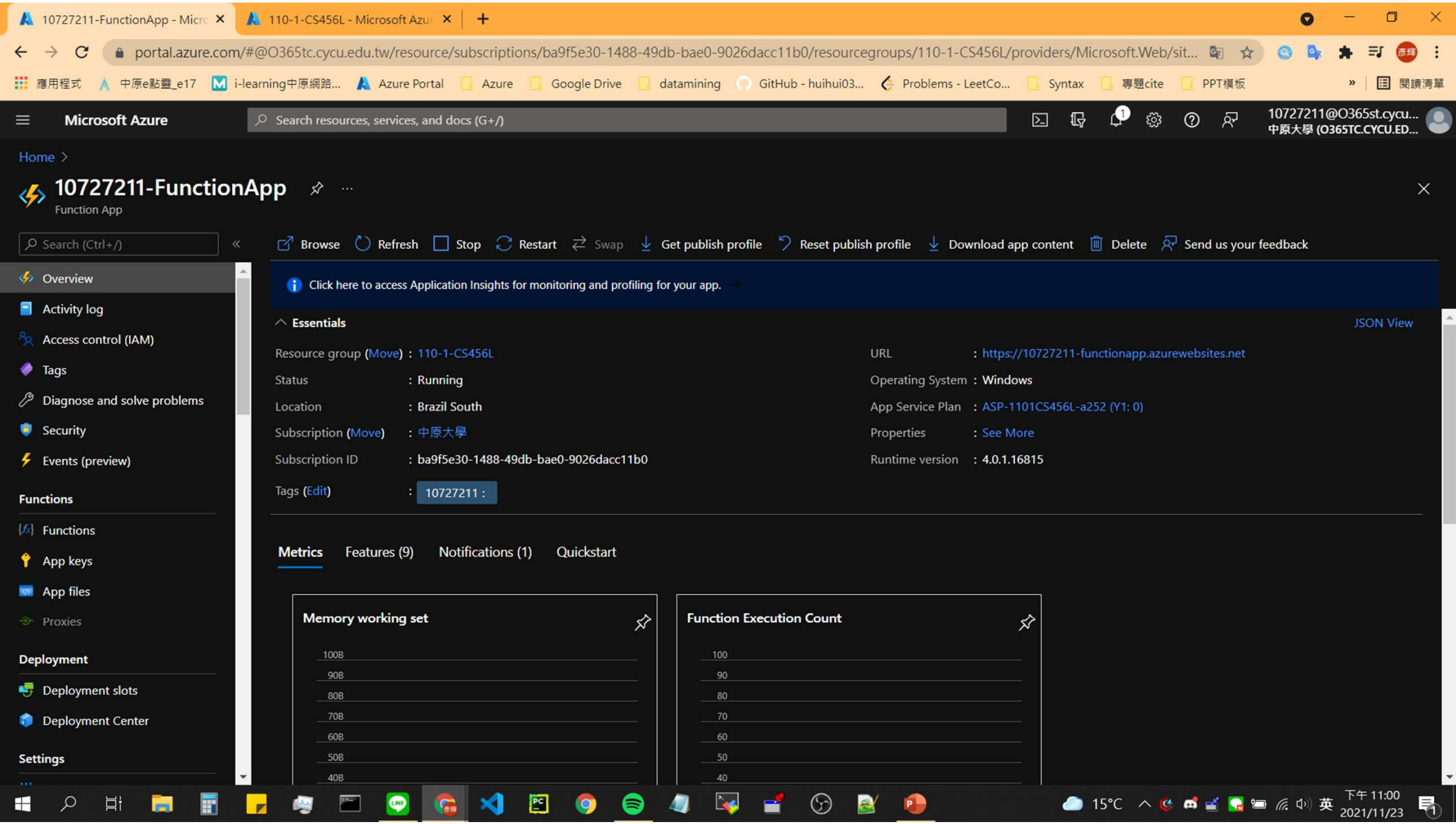
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110-1-CS456L - Microsoft Azur
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Function App
Search (Ctrl+/)
Overview
Activity log
Access control (IAM)
Tags
Diagnose and solve problems
Security
Events (preview)
Functions
Functions
App keys
App files
Proxies
Deployment
Deployment slots
Deployment Center
Settings
Browse
Refresh
Stop
Restart
Swap
Get publish profile
Reset publish profile
Download app content
Delete
Send us your feedback
Click here to access Application Insights for monitoring and profiling for your app.
Essentials
JSON View
Resource group (Move) : 110-1-CS456L
Status : Running
Location : Brazil South
Subscription (Move) : 中原大學
Subscription ID : ba9f5e30-1488-49db-bae0-9026dacc11b0
Tags (Edit) : 10727211 :
URL : https://10727211-functionapp.azurewebsites.net
Operating System : Windows
App Service Plan : ASP-1101CS456L-a252 (Y1: 0)
Properties : See More
Runtime version : 4.0.1.16815
Metrics
Features (9)
Notifications (1)
Quickstart
Memory working set
100B
90B
80B
70B
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50B
40B
Function Execution Count
100
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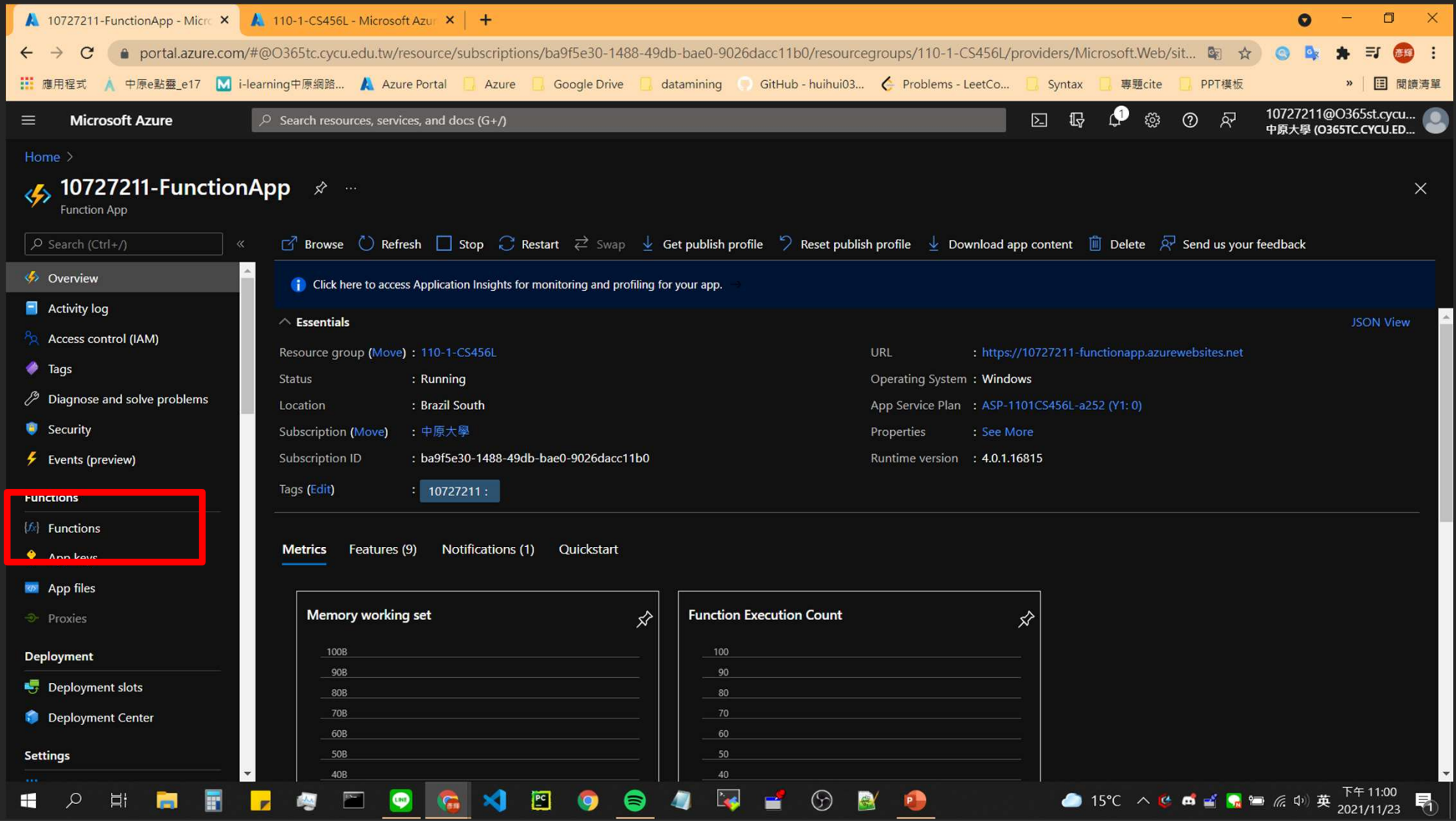
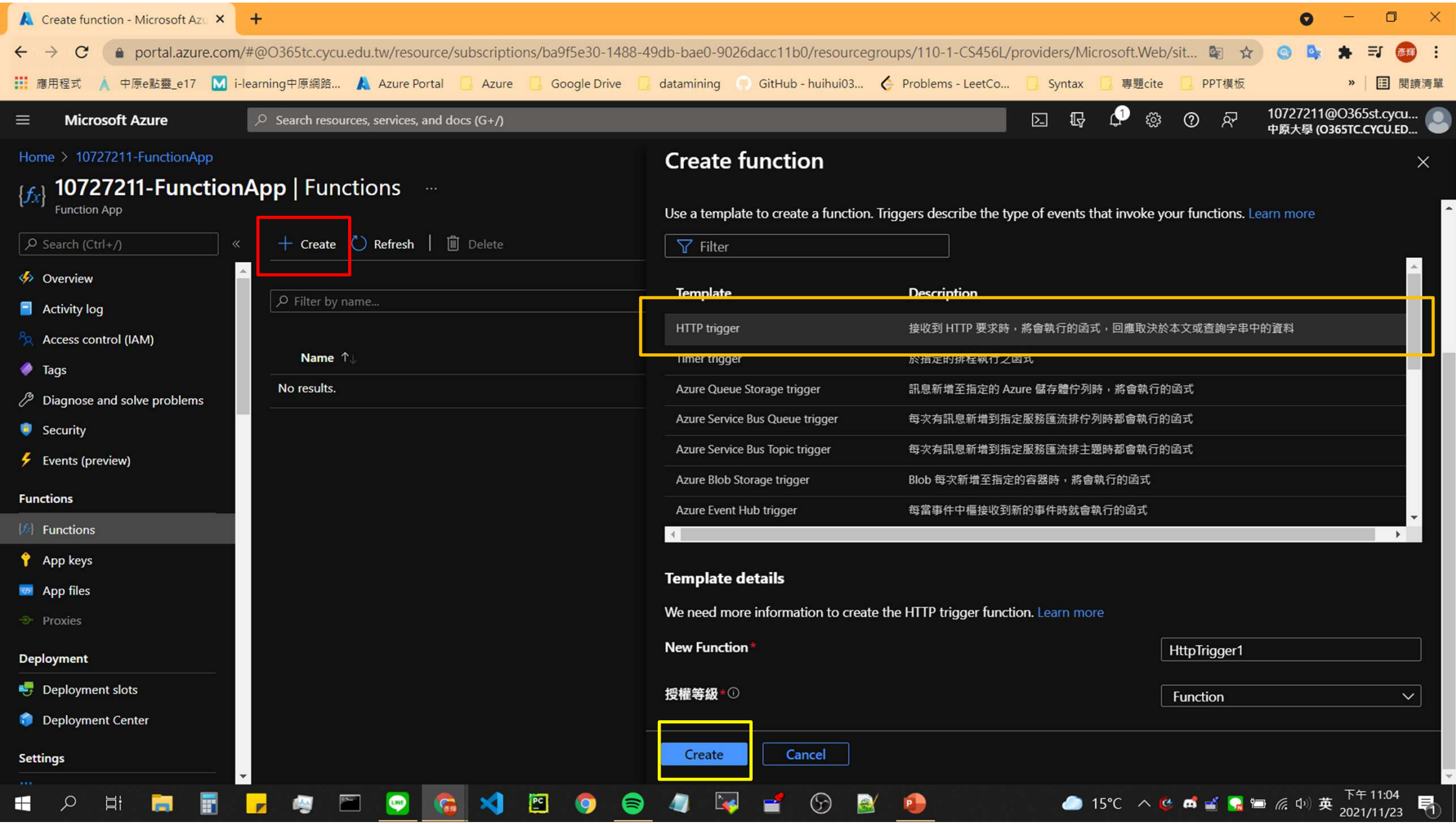
Add a function to your function app




Create function - Microsoft Azu
portal.azure.com/#@O365tc.cycu.edu.tw/resource/subscriptions/ba9f5e30-1488-49db-bae0-9026dacc11b0/resourcegroups/110-1-CS456L/providers/Microsoft.Web/sit...
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Filter by name...
Name
No results.
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Functions
App keys
App files
Proxies
Deployment
Deployment slots
Deployment Center
Settings
Create function
Use a template to create a function. Triggers describe the type of events that invoke your functions. Learn more
Filter
Template
Description
HTTP trigger
接收到 HTTP 要求時，將會執行的函式，回應取決於本文或查詢字串中的資料
Azure Queue Storage trigger
訊息新增至指定的 Azure 儲存體佇列時，將會執行的函式
Azure Service Bus Queue trigger
每次有訊息新增到指定服務匯流排佇列時都會執行的函式
Azure Service Bus Topic trigger
每次有訊息新增到指定服務匯流排主題時都會執行的函式
Azure Blob Storage trigger
Blob 每次新增至指定的容器時，將會執行的函式
Azure Event Hub trigger
每當事件中樞接收到新的事件時就會執行的函式
Template details
We need more information to create the HTTP trigger function. Learn more
New Function *
HttpTrigger1
授權等級 *
Function
Create
Cancel
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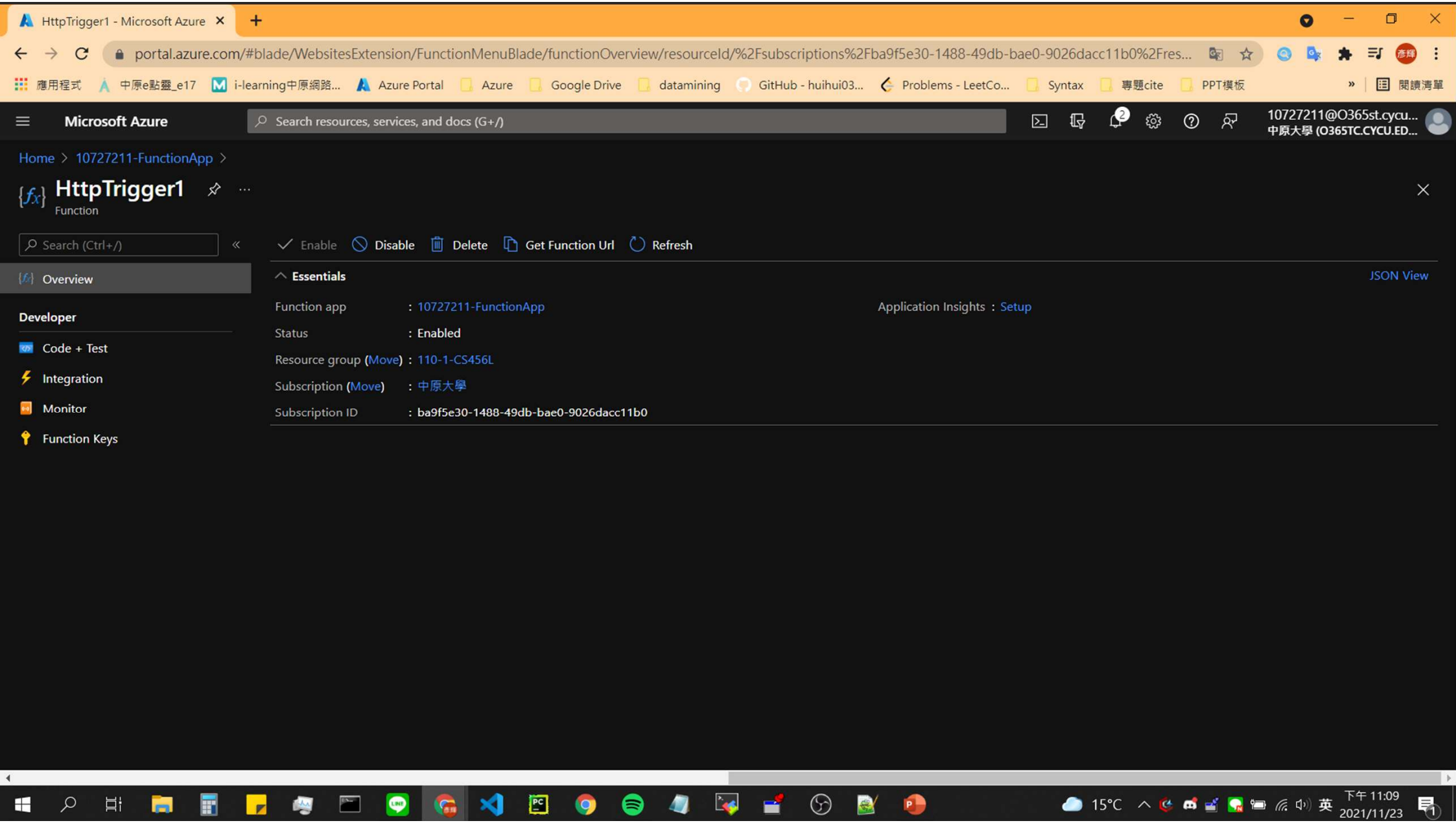
HttpTrigger1 - Microsoft Azure
portal.azure.com/#blade/WebsitesExtension/FunctionMenuBlade/functionOverview/resourceId/%2Fsubscriptions%2Fba9f5e30-1488-49db-bae0-9026dacc11b0%2Fres...
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Get Function Url
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Essentials
JSON View
Function app : 10727211-FunctionApp
Application Insights : Setup
Status : Enabled
Resource group (Move) : 110-1-CS456L
Subscription (Move) : 中原大學
Subscription ID : ba9f5e30-1488-49db-bae0-9026dacc11b0
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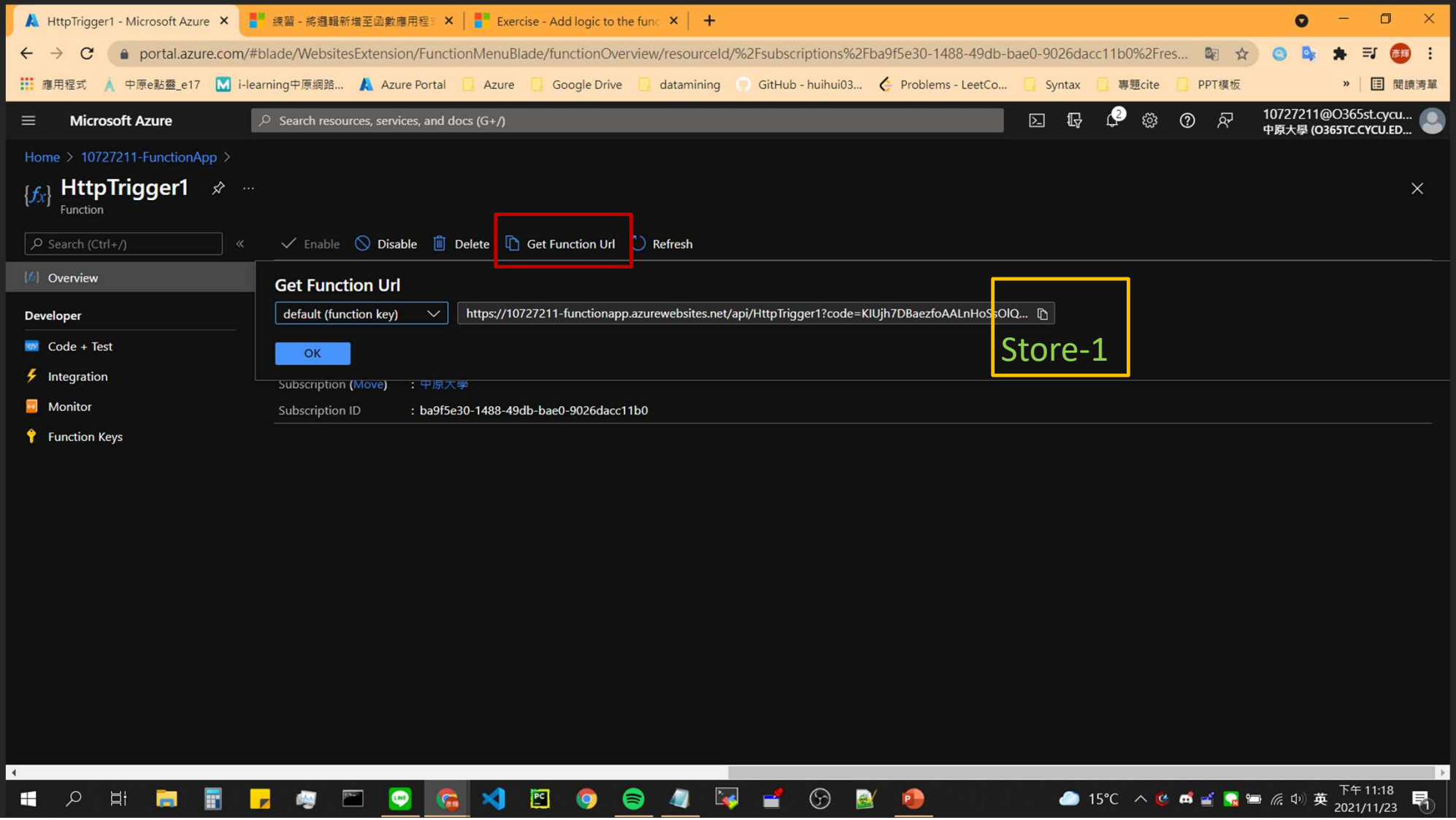
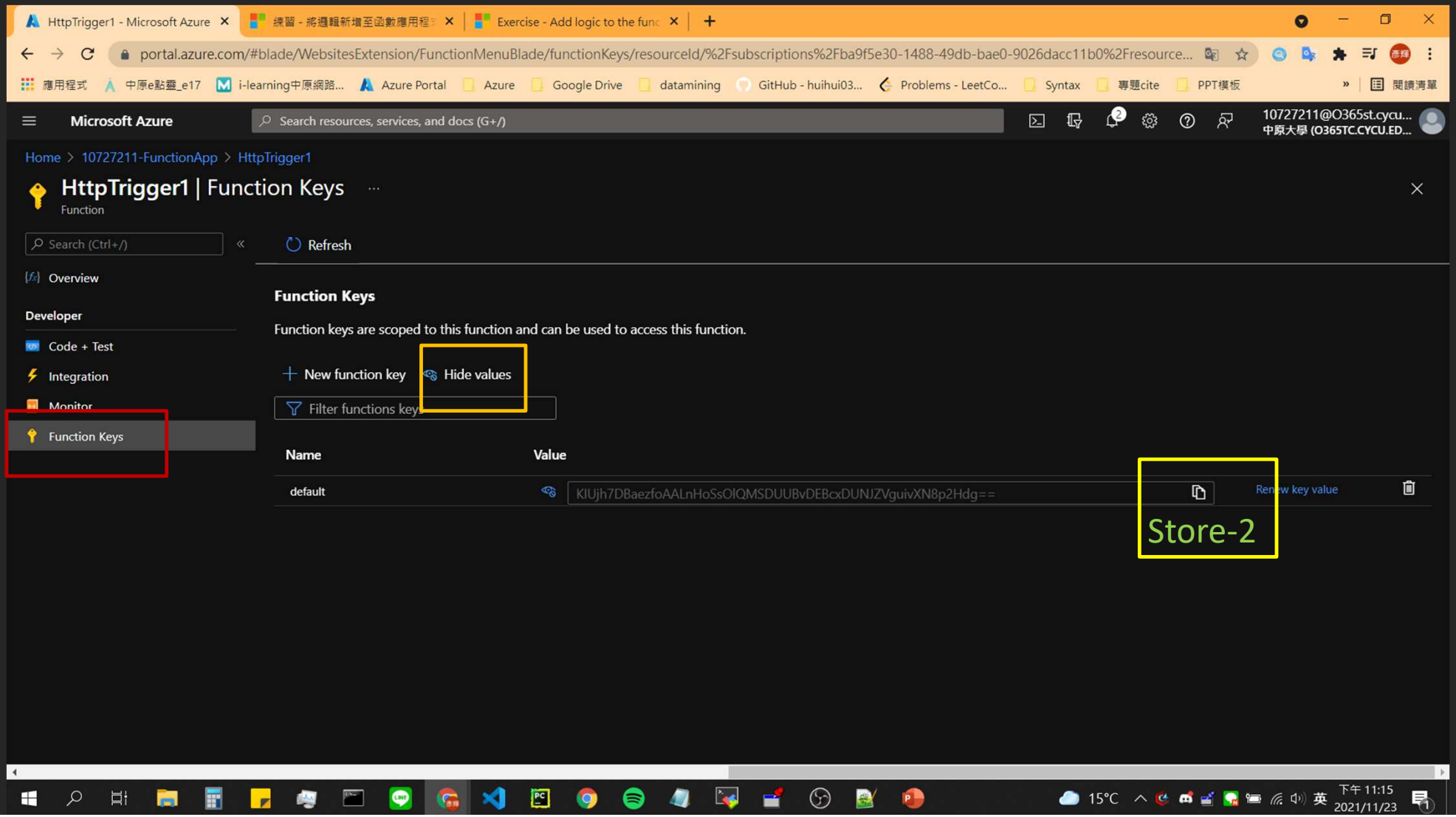
Get Function URL

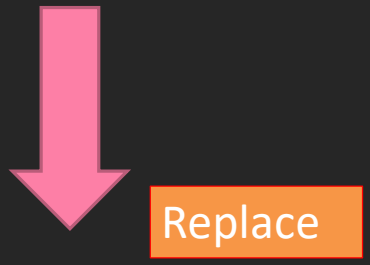


Secure HTTP triggers



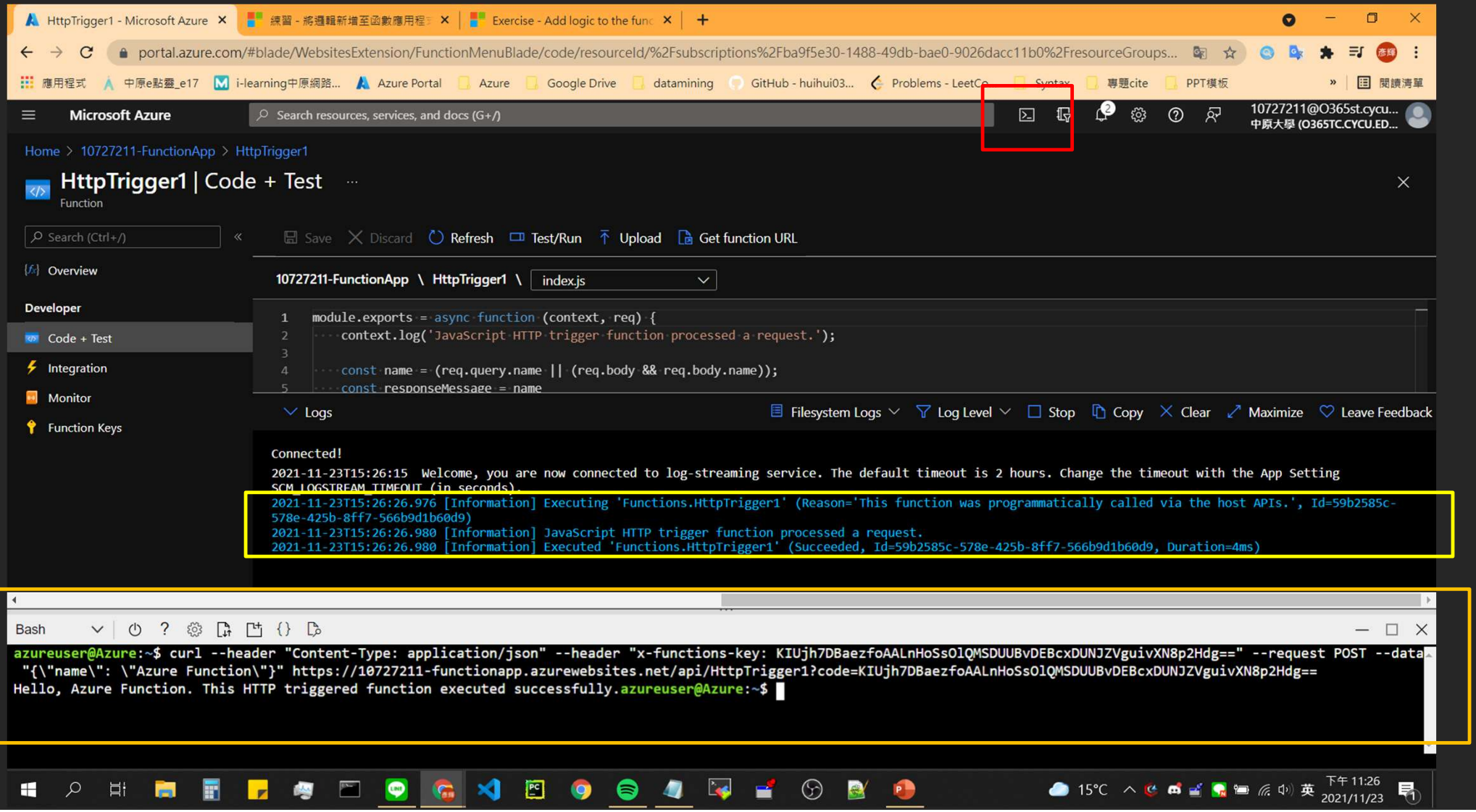
Test Function

curl --header "Content-Type: application/json" --header "x-functions-key: <your-function-key>" --request POST --data "{\"name\": \"Azure Function\"}" <your-https-url>

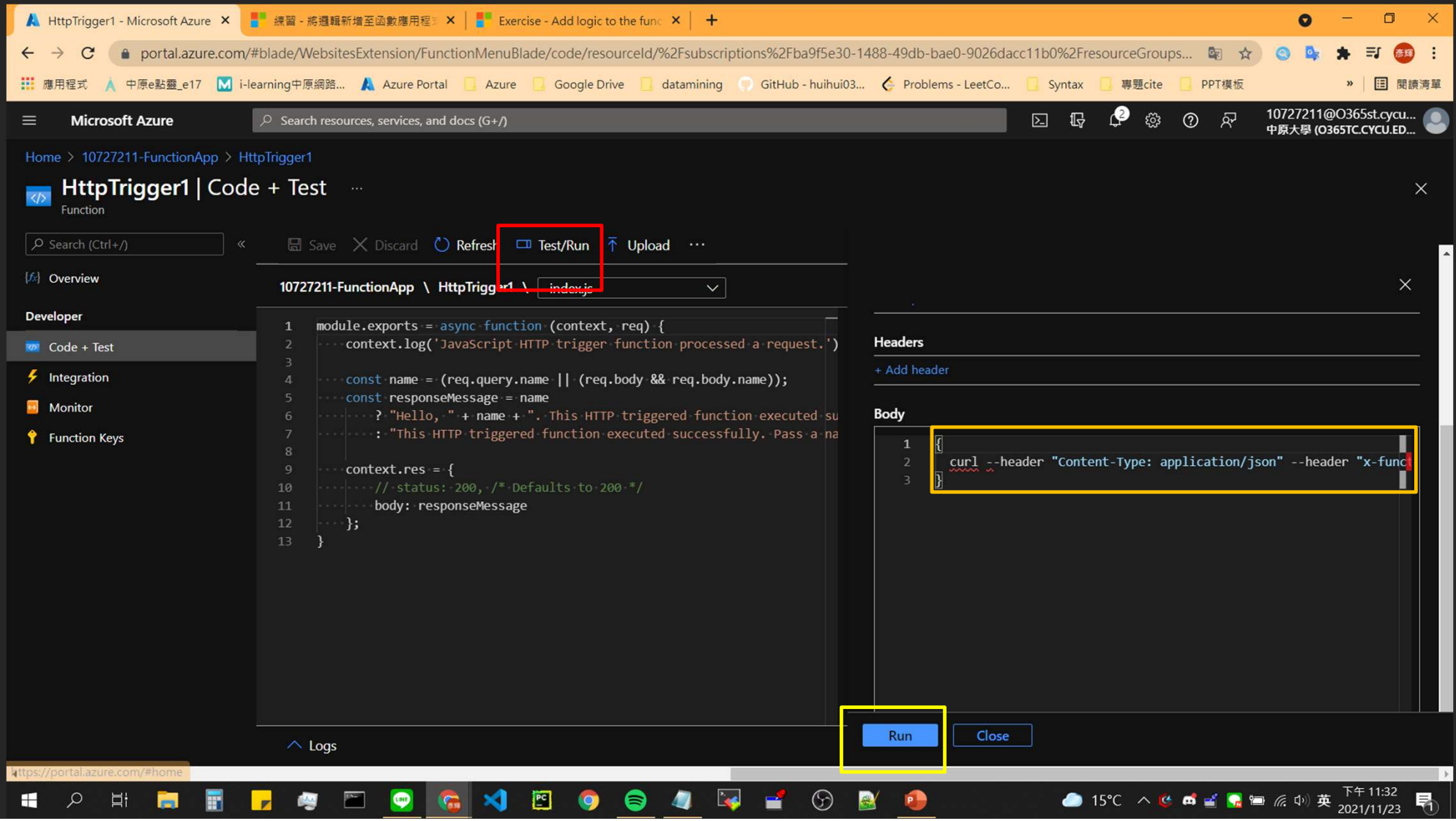


curl --header "Content-Type: application/json" --header "x-functions-key: KIUjh7DBaezfoAALnHoSsOlQMSDUUBvDEBcxDUNJZVguivXN8p2Hdg==" --request POST --data "{\"name\": \"Azure Function\"}" https://10727211-functionapp.azurewebsites.net/api/HttpTrigger1?code=KIUjh7DBaezfoAALnHoSsOlQMSDUUBvDEBcxDUNJZVguivXN8p2Hdg==

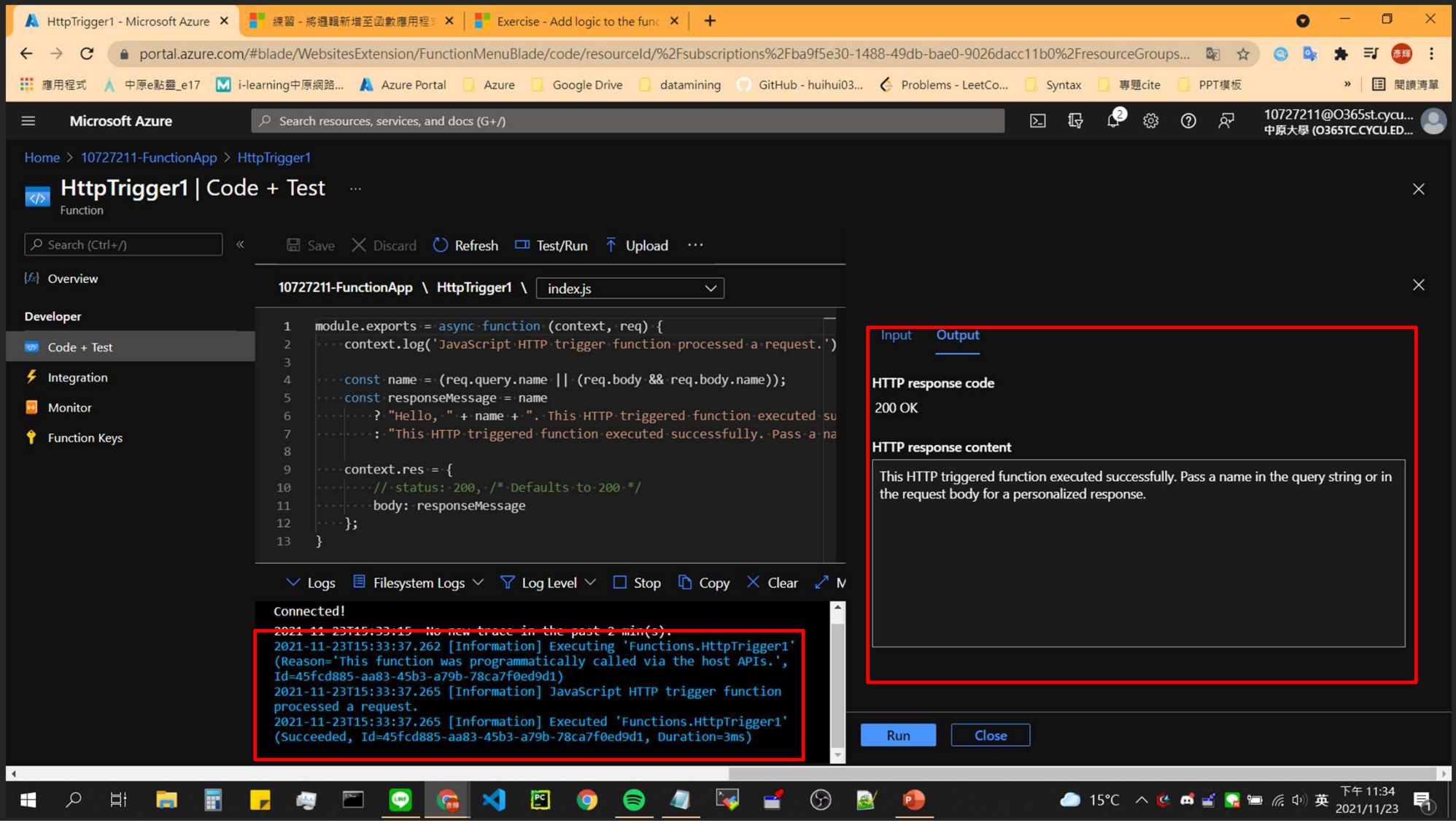
Test Function - 1



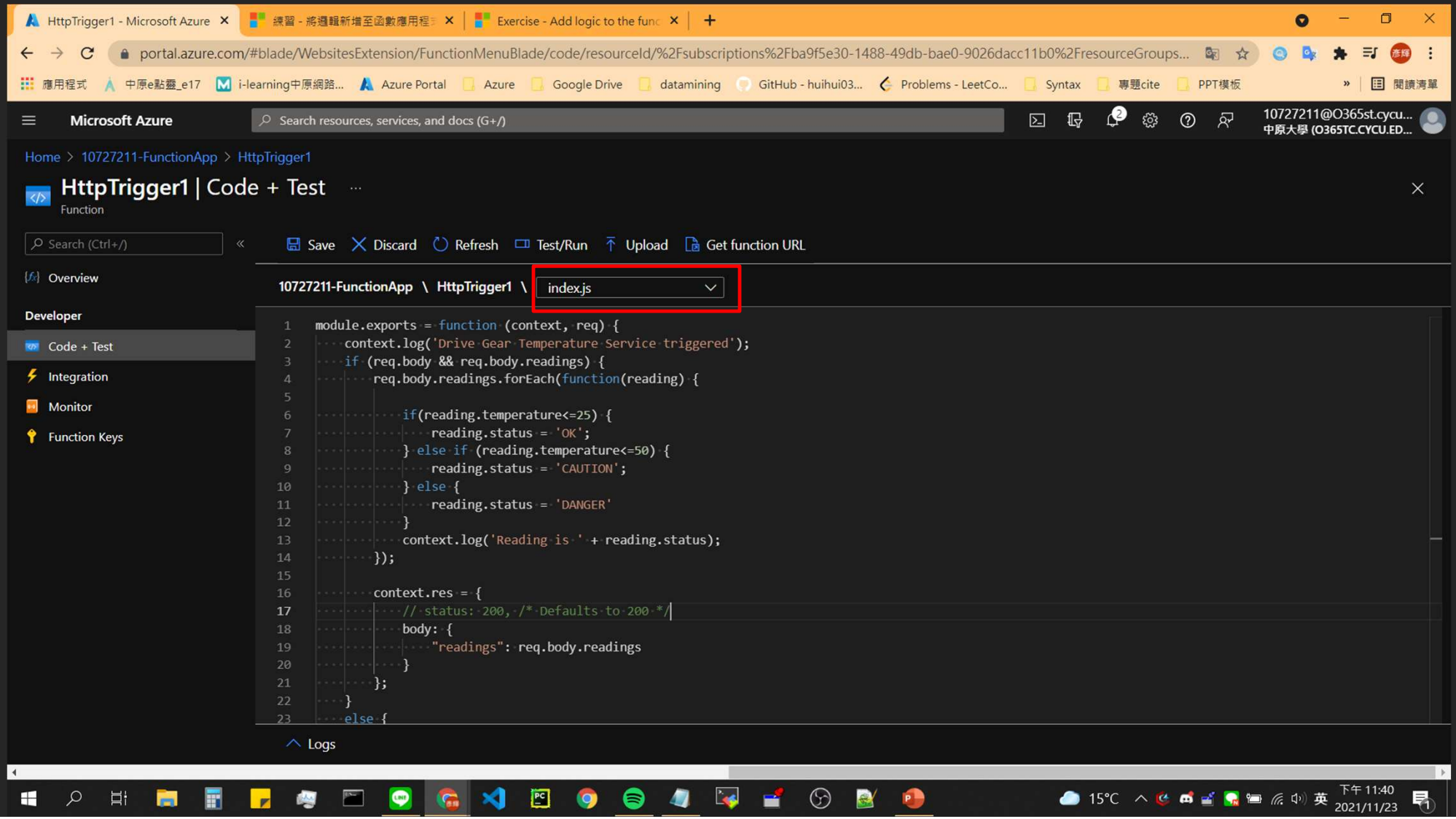
Test Function - 2



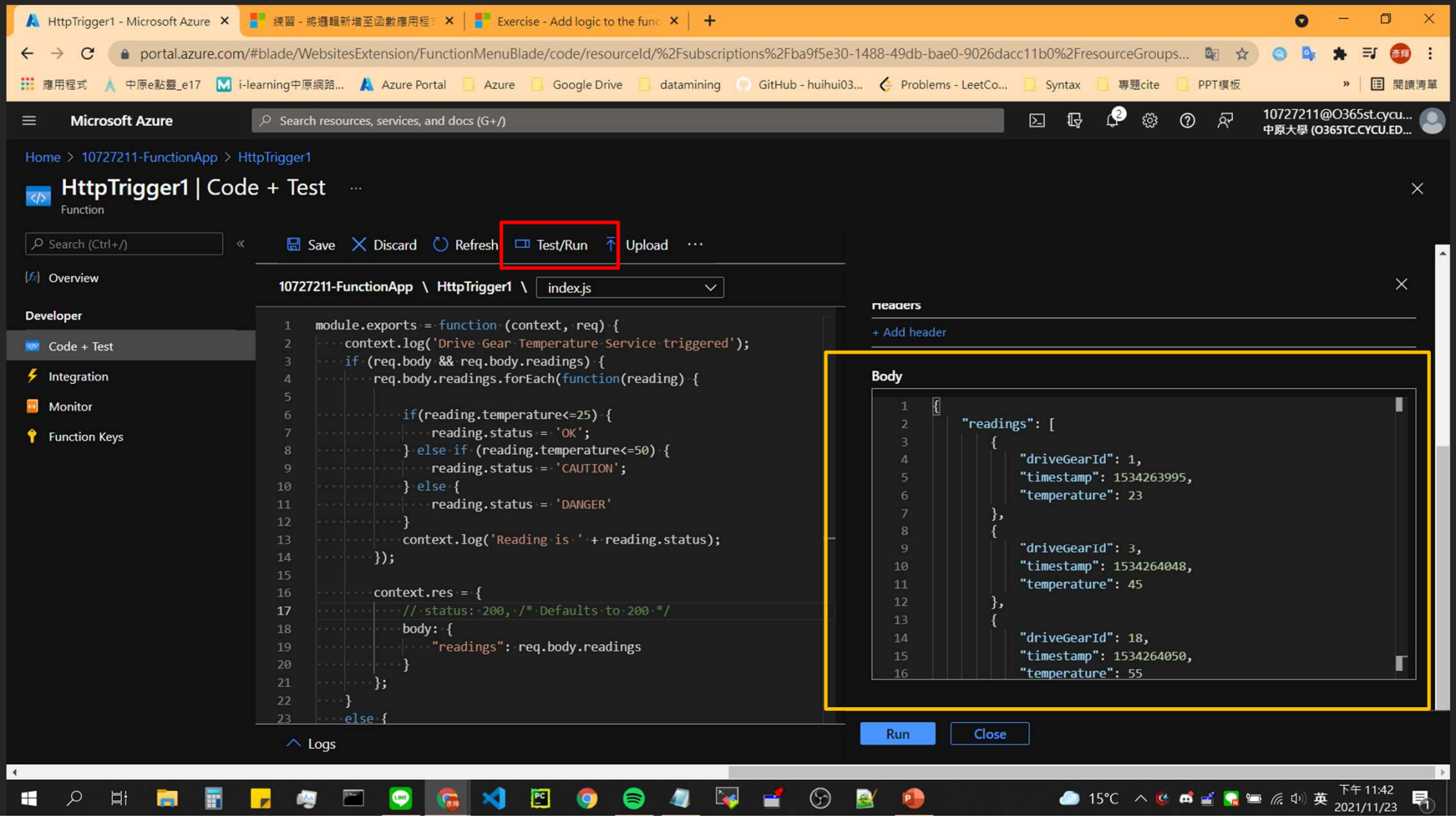
Test Function - 2



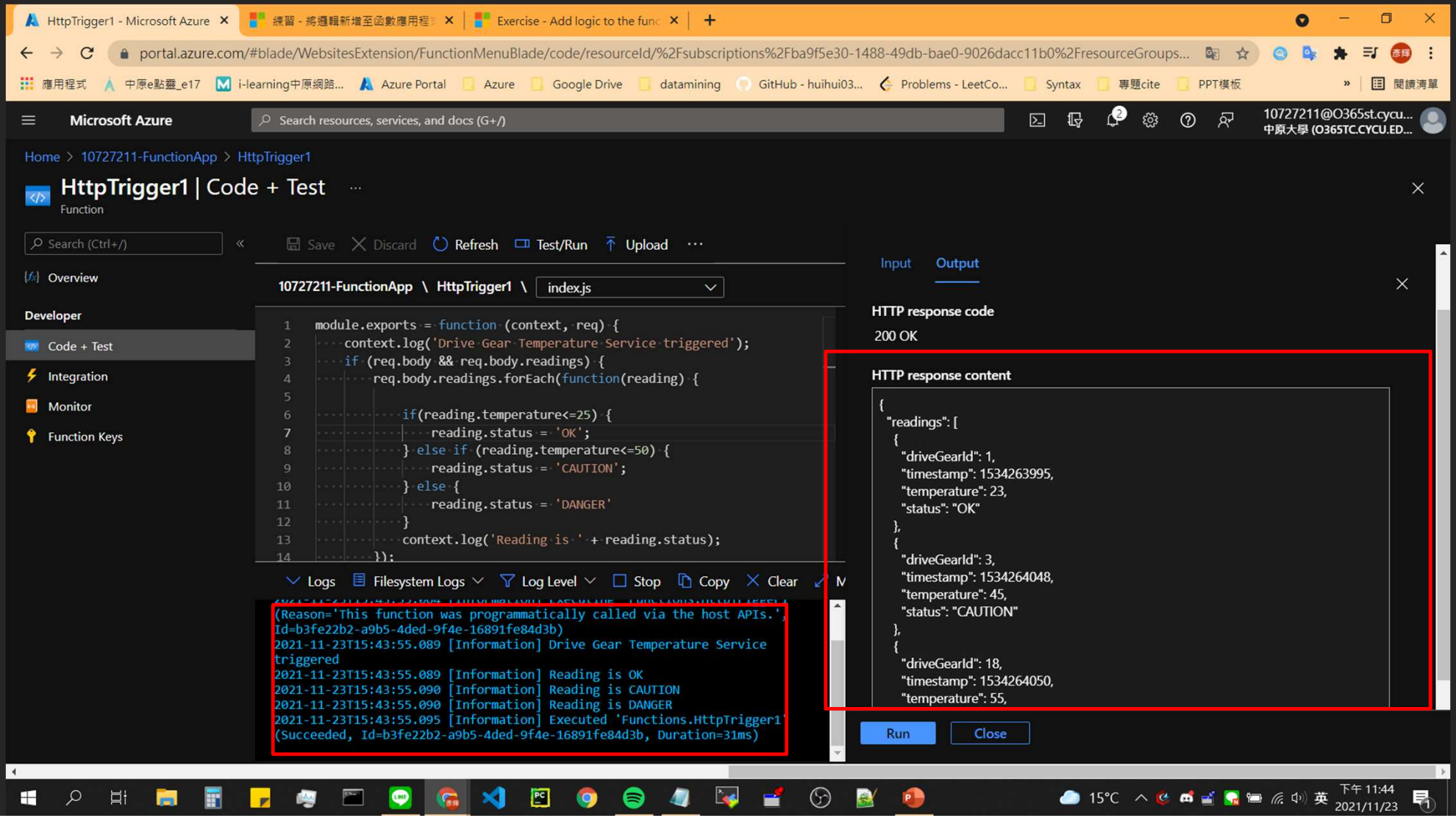
Replace index.js



Replace Test Body

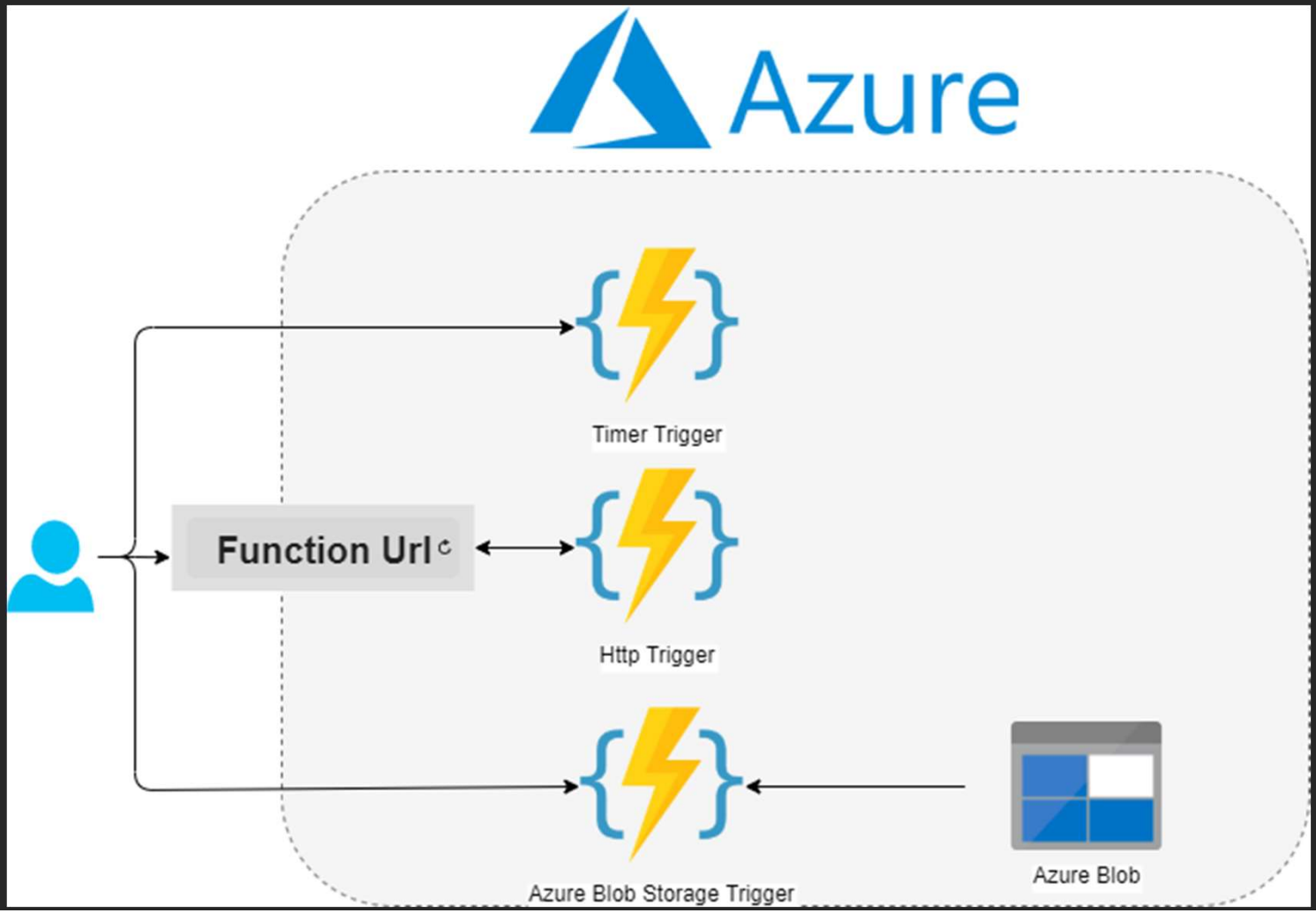


Result

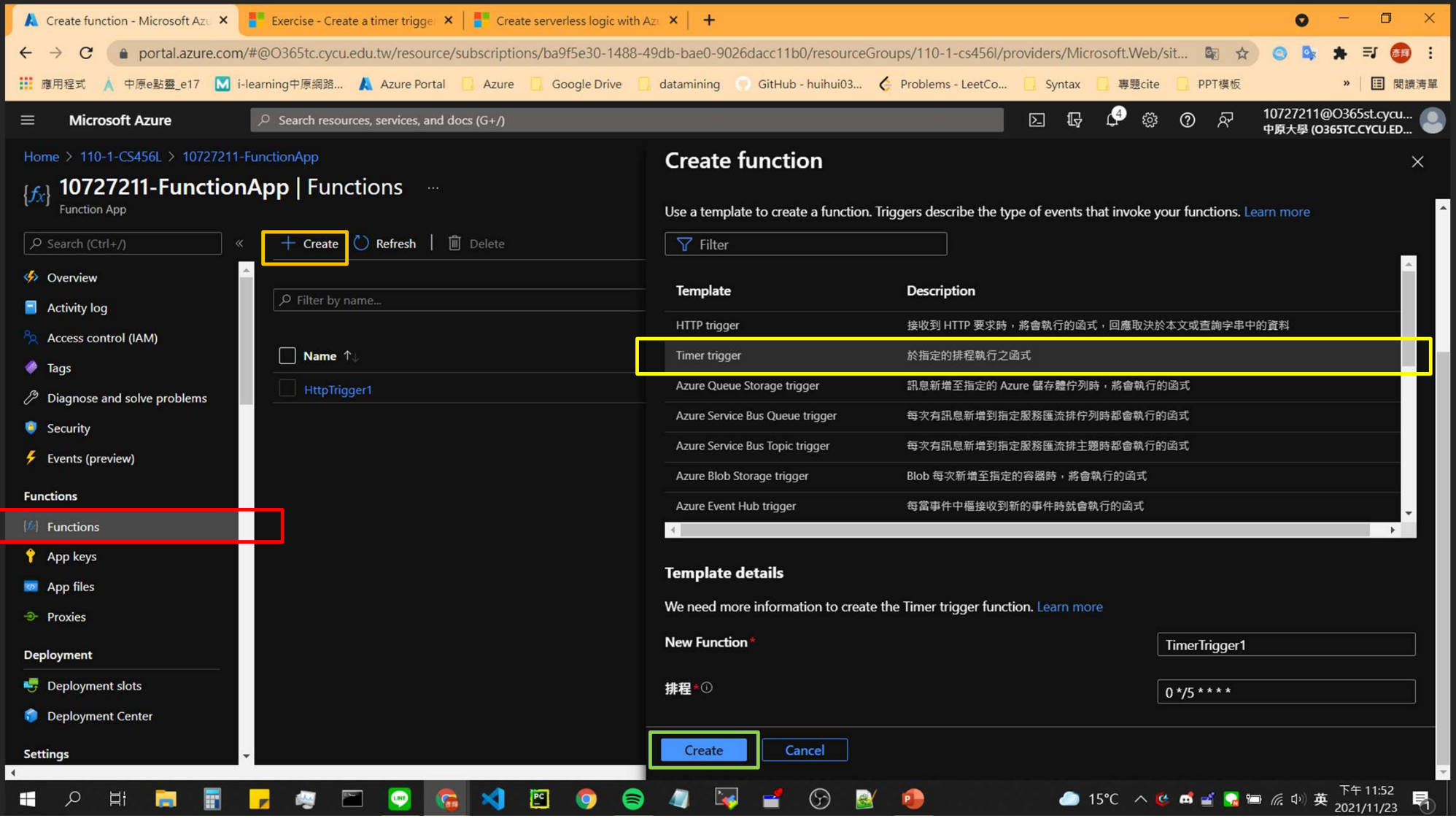

HttpTrigger1 - Microsoft Azure
Exercise - Add logic to the func
portal.azure.com/#blade/WebsitesExtension/FunctionMenuBlade/code/resourceId/%2Fsubscriptions%2Fba9f5e30-1488-49db-bae0-9026dacc11b0%2FresourceGroups...
Microsoft Azure
Search resources, services, and docs (G+/)
Home > 10727211-FunctionApp > HttpTrigger1
HttpTrigger1 | Code + Test
Function
Search (Ctrl+/)
Overview
Developer
Code + Test
Integration
Monitor
Function Keys
Save
Discard
Refresh
Test/Run
Upload
10727211-FunctionApp \ HttpTrigger1 \ index.js
module.exports = function (context, req) {
context.log('Drive Gear Temperature Service triggered');
if (req.body && req.body.readings) {
req.body.readings.forEach(function(reading) {
if(reading.temperature<=25) {
reading.status = 'OK';
} else if (reading.temperature<=50) {
reading.status = 'CAUTION';
} else {
reading.status = 'DANGER'
}
context.log('Reading is ' + reading.status);
});
Logs
Filesystem Logs
Log Level
Stop
Copy
Clear
(Reason='This function was programmatically called via the host APIs.',
Id=b3fe22b2-a9b5-4ded-9f4e-16891fe84d3b)
2021-11-23T15:43:55.089 [Information] Drive Gear Temperature Service
triggered
2021-11-23T15:43:55.089 [Information] Reading is OK
2021-11-23T15:43:55.090 [Information] Reading is CAUTION
2021-11-23T15:43:55.090 [Information] Reading is DANGER
2021-11-23T15:43:55.095 [Information] Executed 'Functions.HttpTrigger1'
(Succeeded, Id=b3fe22b2-a9b5-4ded-9f4e-16891fe84d3b, Duration=31ms)
Input
Output
HTTP response code
200 OK
HTTP response content
{
"readings": [
{
"driveGearId": 1,
"timestamp": 1534263995,
"temperature": 23,
"status": "OK"
},
{
"driveGearId": 3,
"timestamp": 1534264048,
"temperature": 45,
"status": "CAUTION"
},
{
"driveGearId": 18,
"timestamp": 1534264050,
"temperature": 55,
Run
Close
15°C
下午 11:44
2021/11/23

03 Execute an Azure Function with triggers

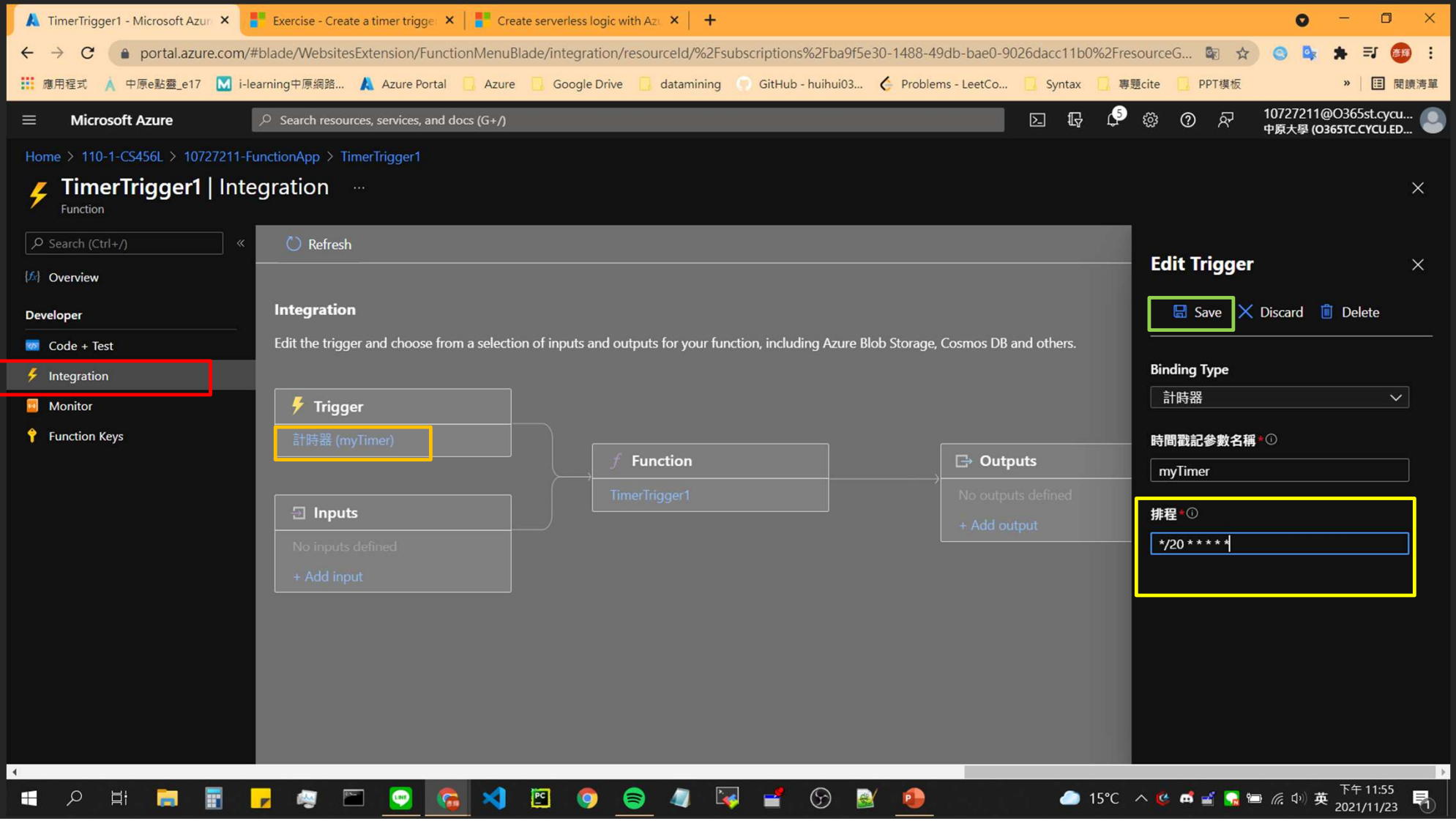
Abstract


Azure
Timer Trigger
Function Url
Http Trigger
Azure Blob Storage Trigger
Azure Blob

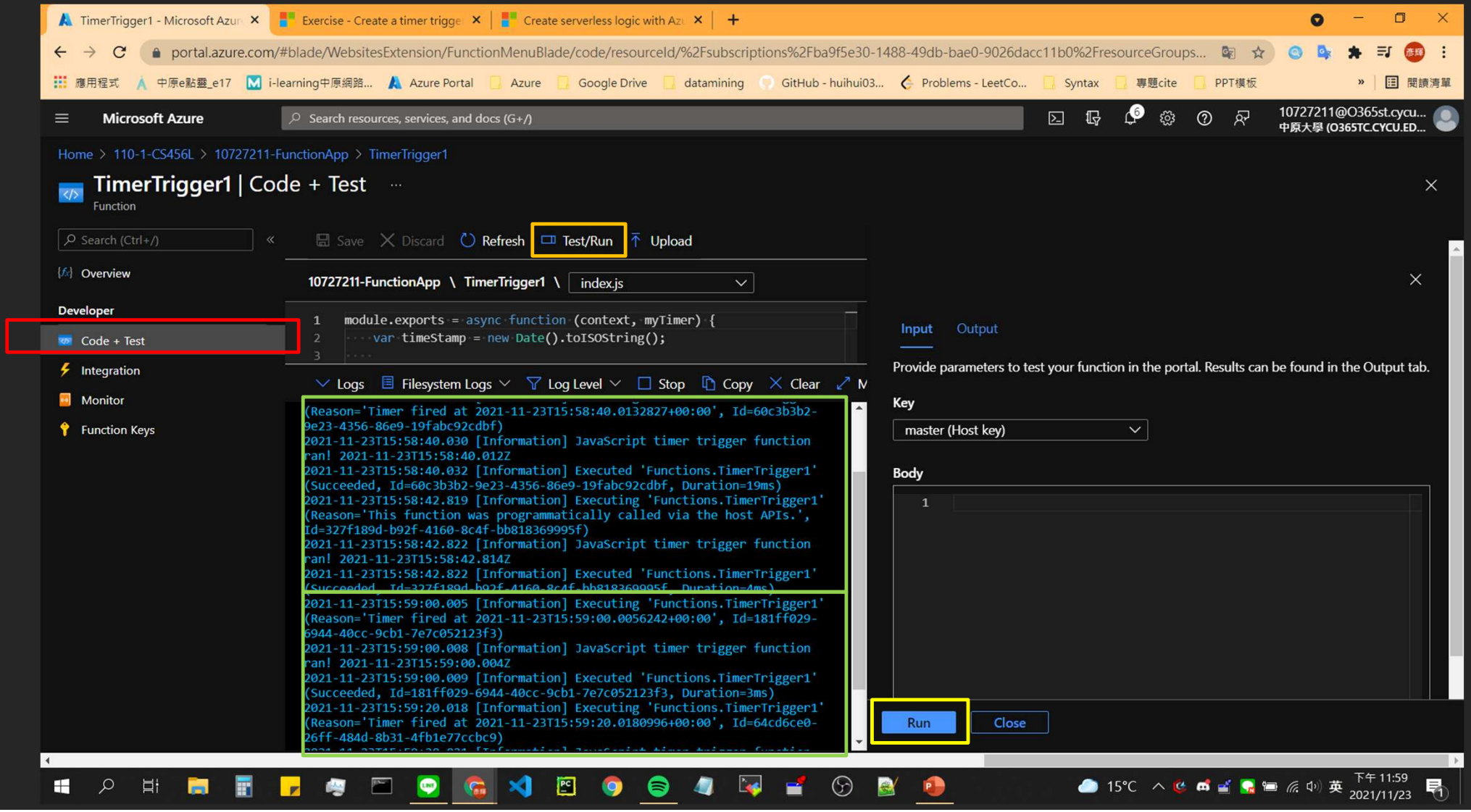
Create a timer-triggered function



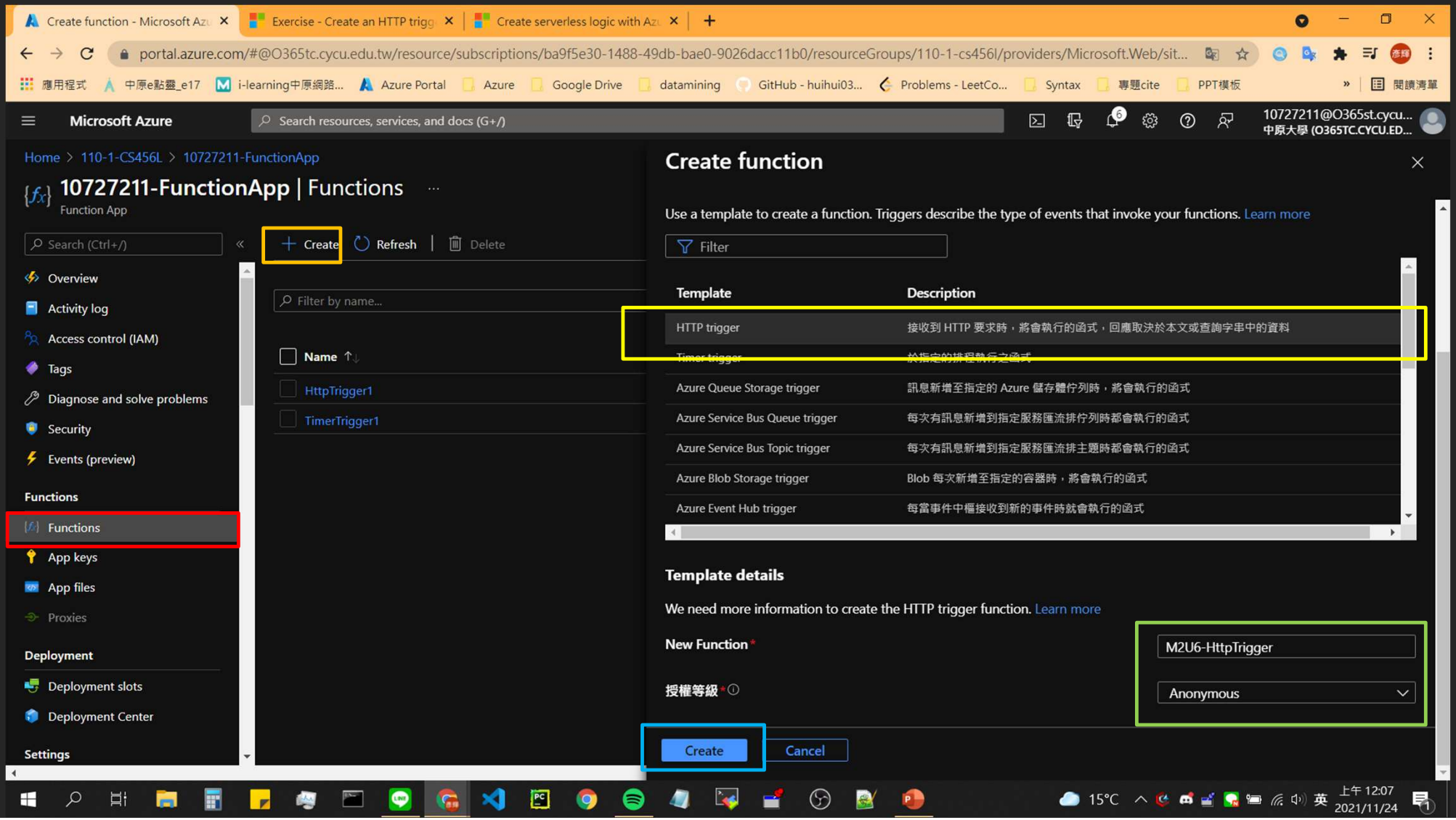
Configure the timer trigger



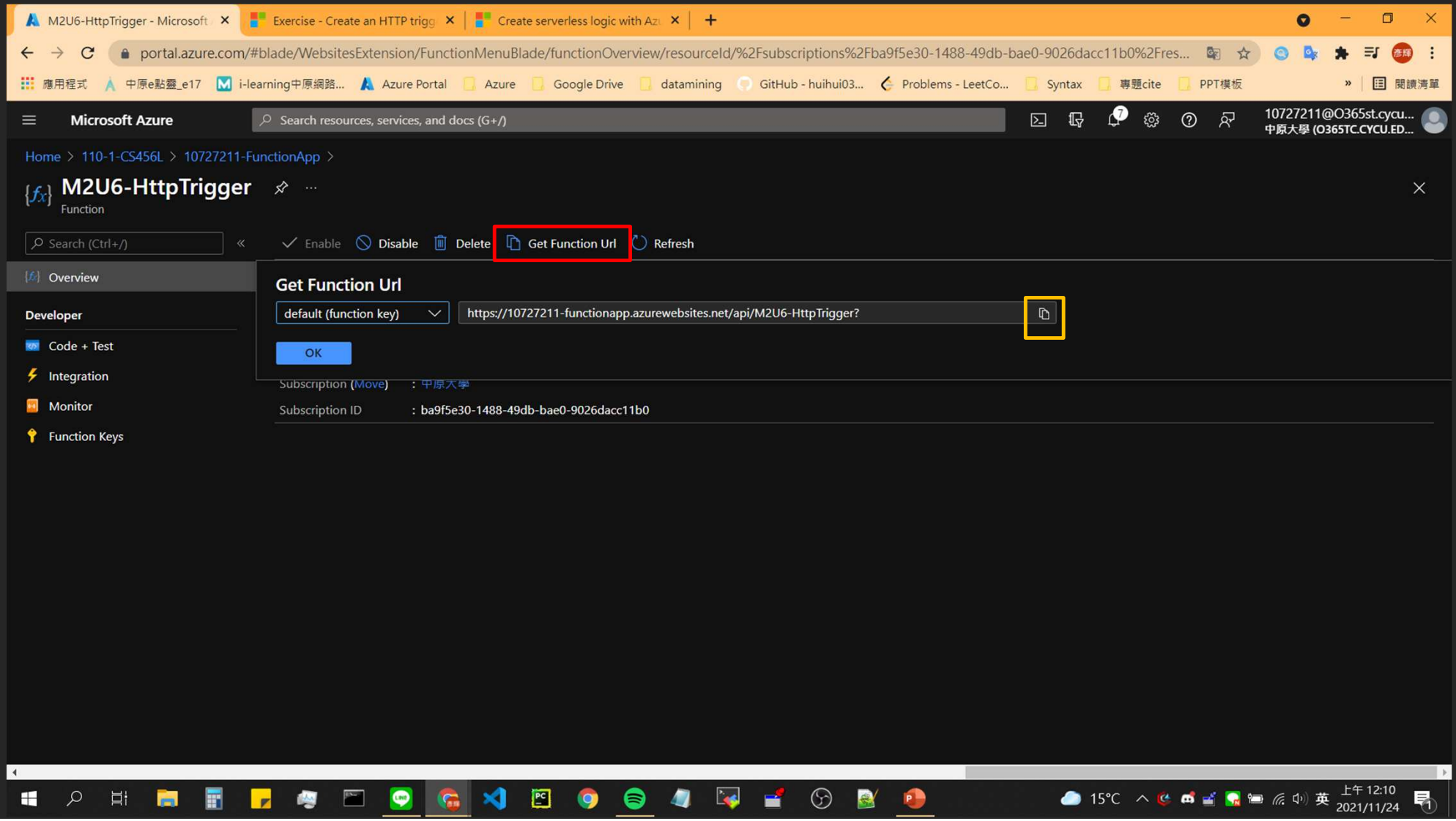
Test the timer



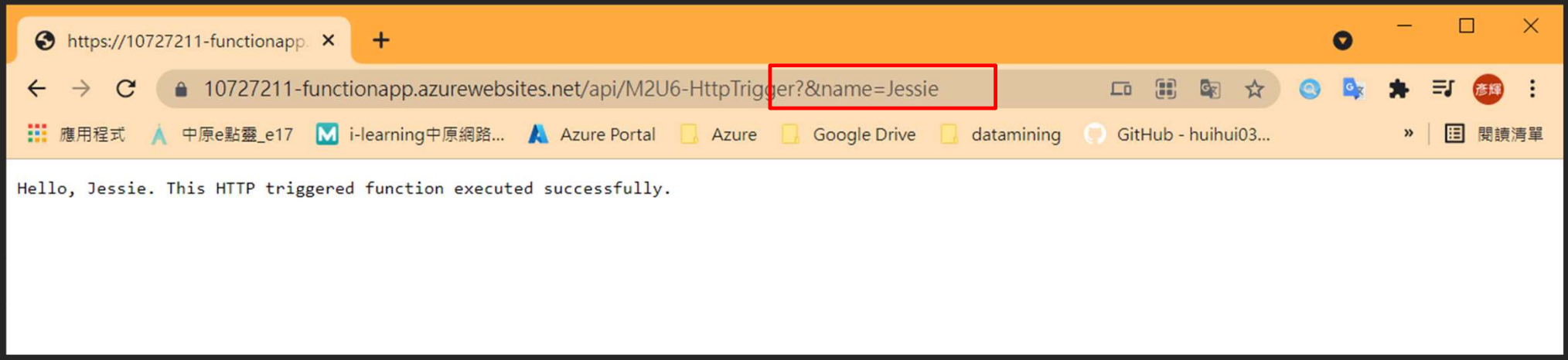
Create a http-triggered function



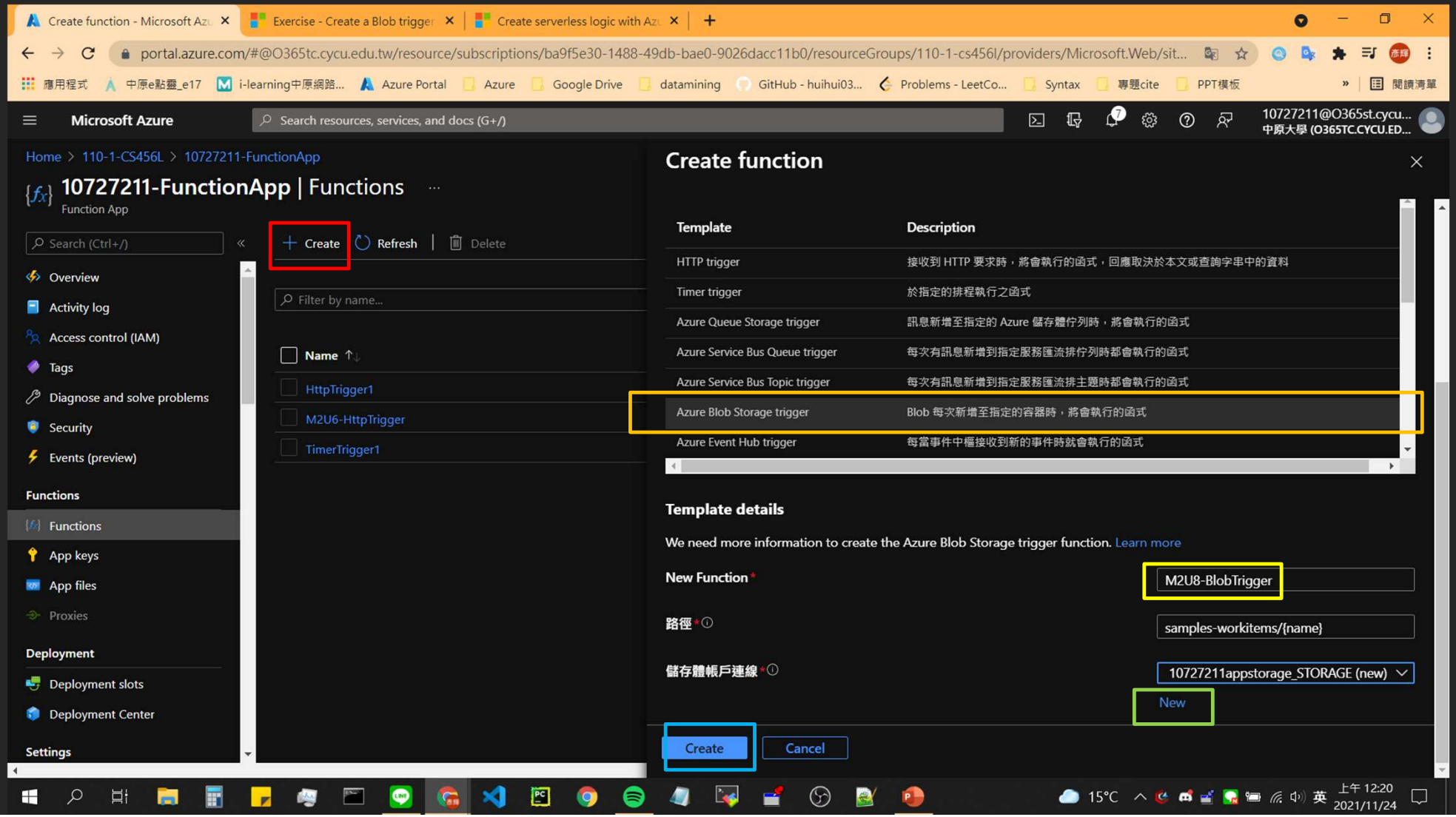
Get Function Url



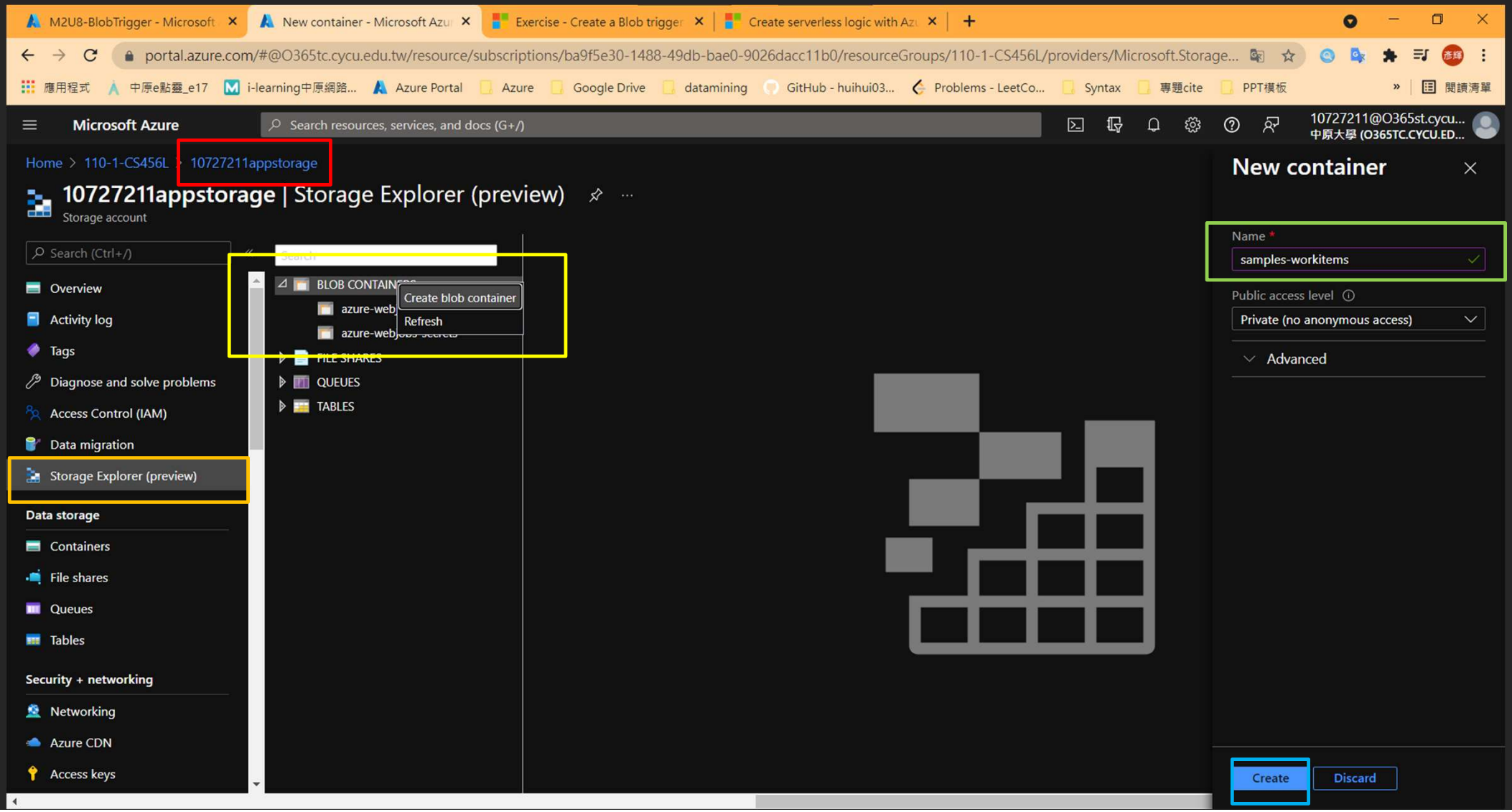
Test Function Url



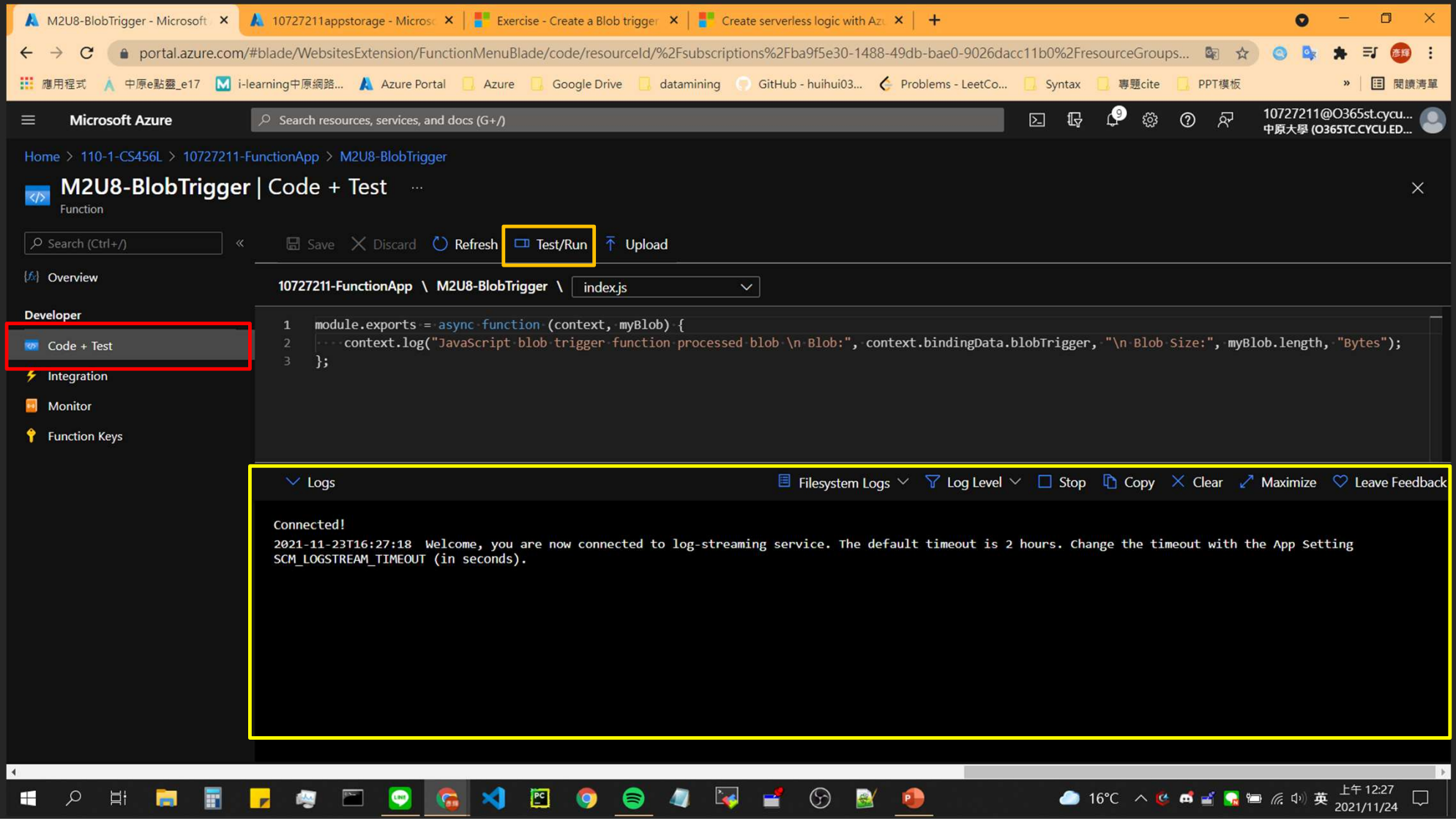
Create a blog trigger



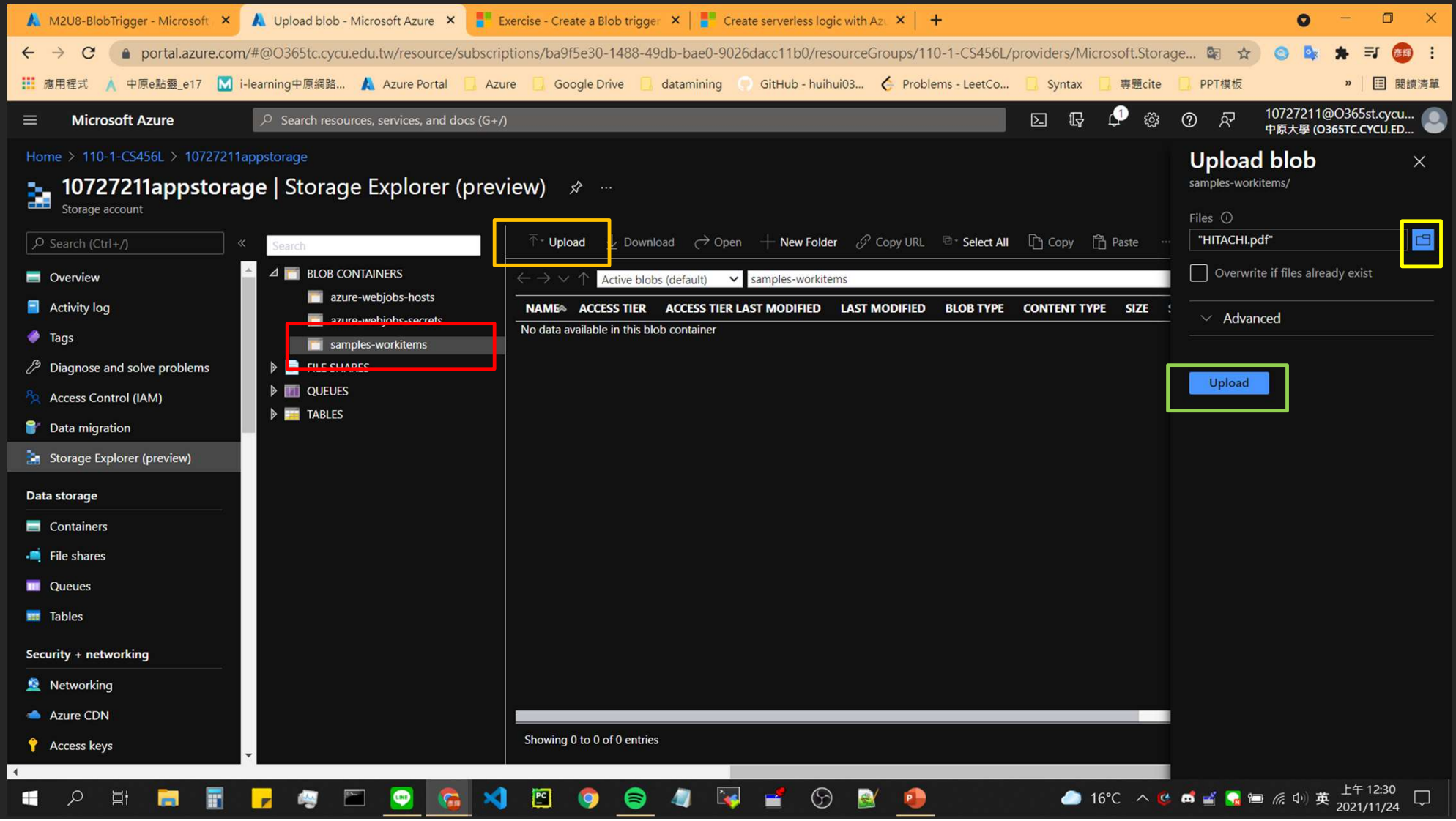
Create a blog container (create new tab)



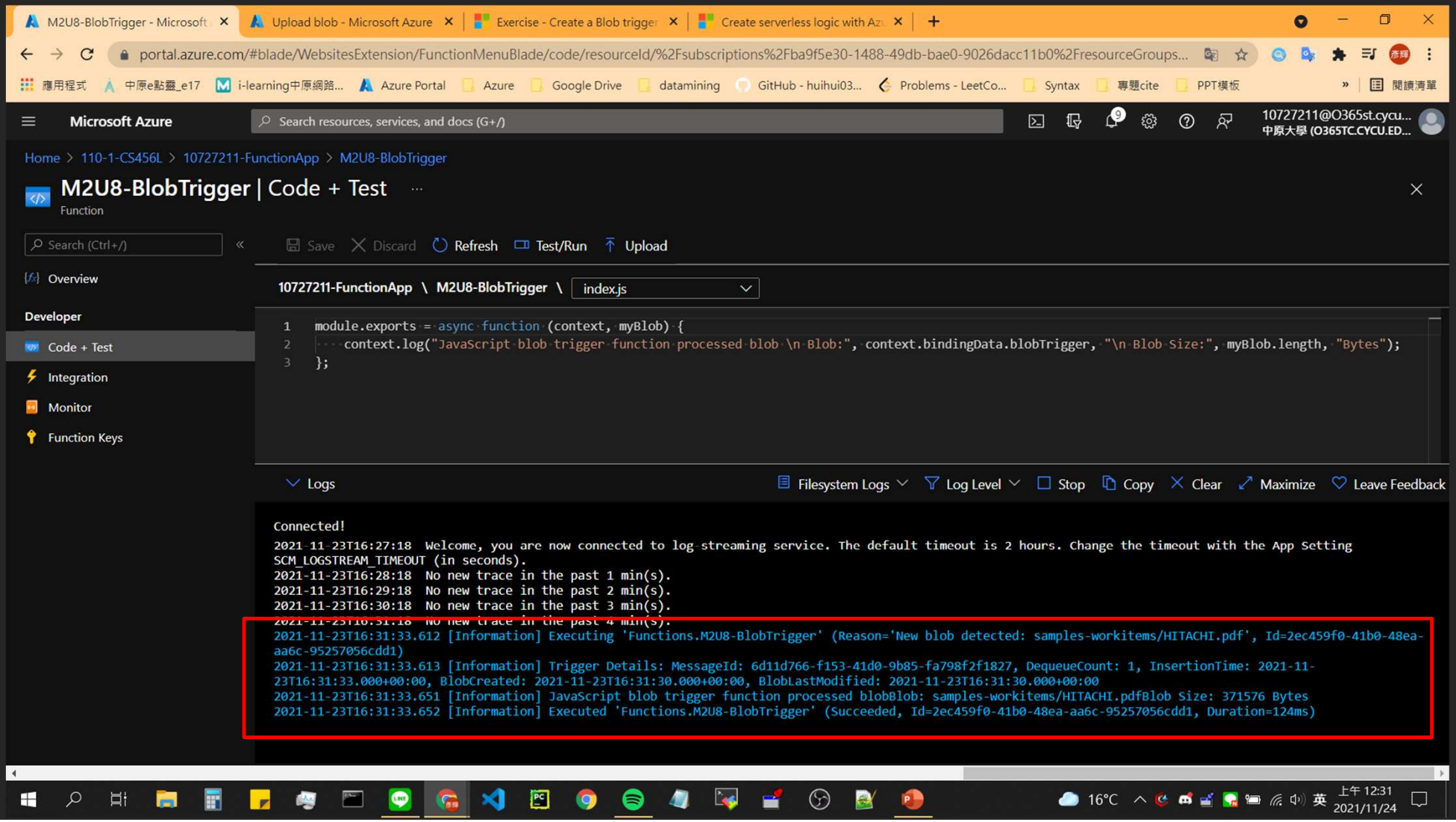
Turn on your blog trigger



Create a blob

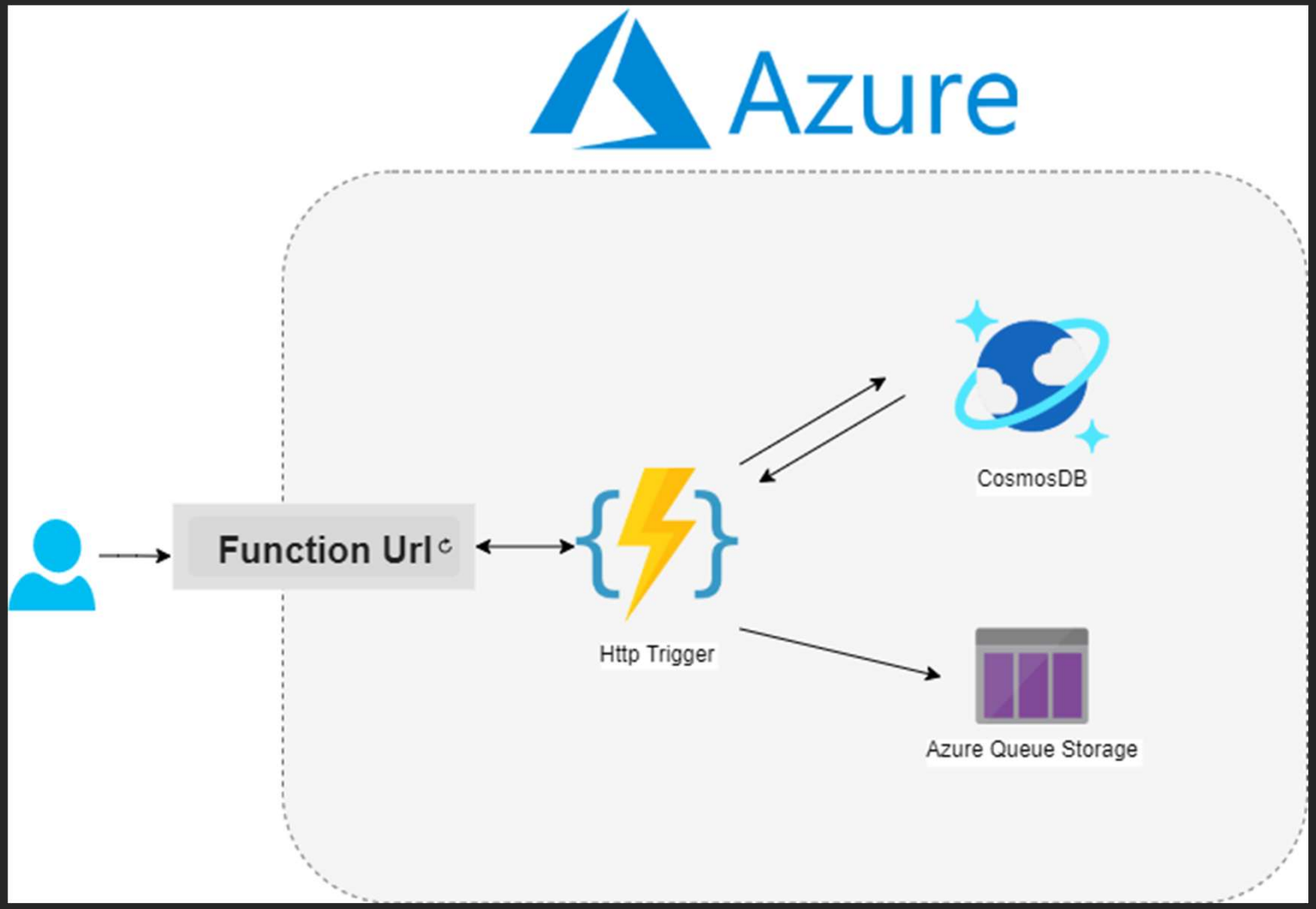


Result

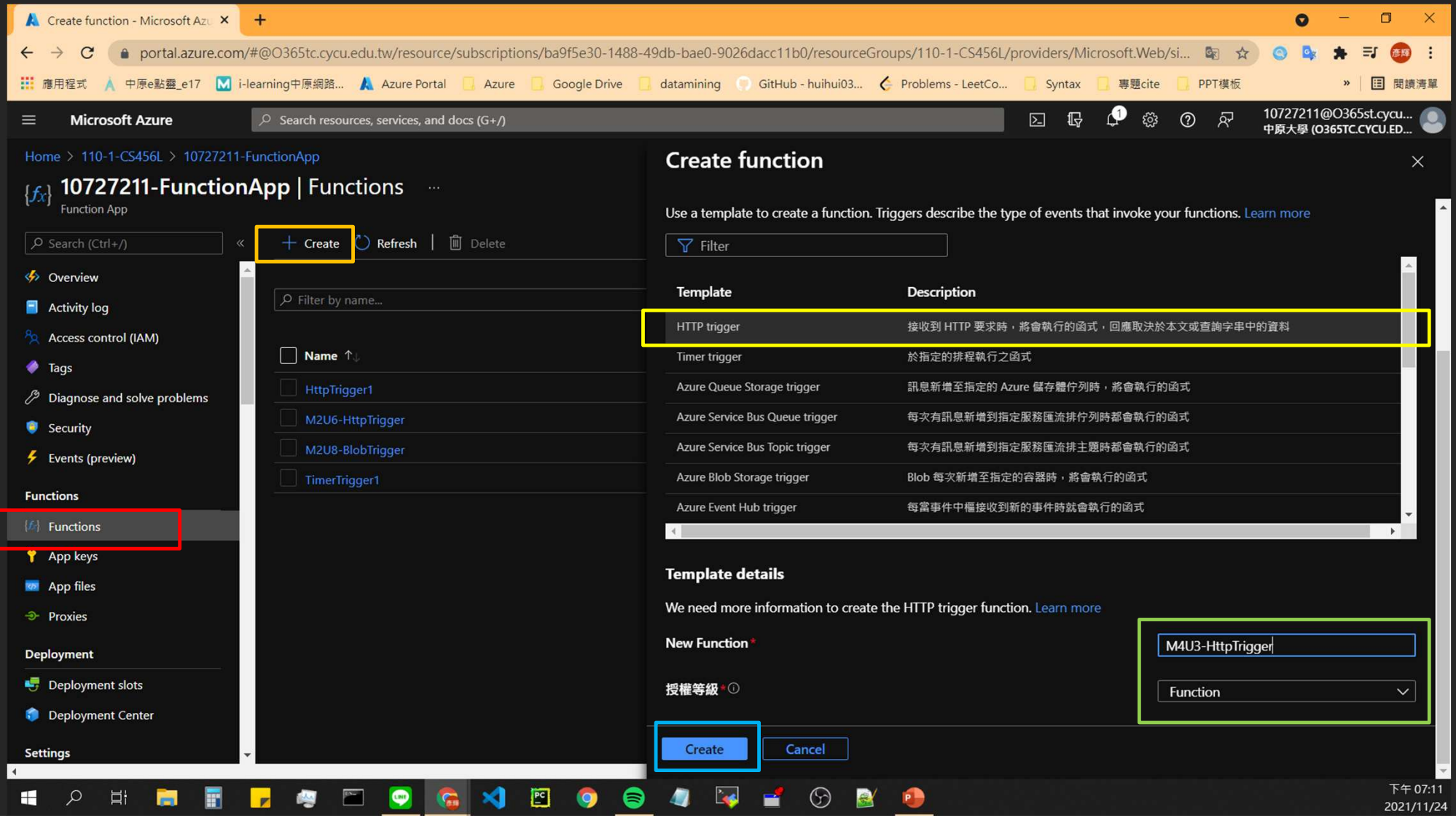

M2U8-BlobTrigger - Microsoft
Upload blob - Microsoft Azure
Exercise - Create a Blob trigger
Create serverless logic with Az
portal.azure.com/#blade/WebsitesExtension/FunctionMenuBlade/code/resourceId/%2Fsubscriptions%2Fba9f5e30-1488-49db-bae0-9026dacc11b0%2FresourceGroups...
Microsoft Azure
Search resources, services, and docs (G+/)
10727211@O365st.cycu...
中原大學 (O365TC.CYCU.ED...
Home > 110-1-CS456L > 10727211-FunctionApp > M2U8-BlobTrigger
M2U8-BlobTrigger | Code + Test
Function
Search (Ctrl+/)
Overview
Developer
Code + Test
Integration
Monitor
Function Keys
Save
Discard
Refresh
Test/Run
Upload
10727211-FunctionApp \ M2U8-BlobTrigger \ index.js
1 module.exports = async function (context, myBlob) {
2 context.log("JavaScript blob trigger function processed blob \n Blob:", context.bindingData.blobTrigger, "\n Blob Size:", myBlob.length, "Bytes");
3 };
Logs
Filesystem Logs
Log Level
Stop
Copy
Clear
Maximize
Leave Feedback
Connected!
2021-11-23T16:27:18 Welcome, you are now connected to log-streaming service. The default timeout is 2 hours. Change the timeout with the App Setting SCM_LOGSTREAM_TIMEOUT (in seconds).
2021-11-23T16:28:18 No new trace in the past 1 min(s).
2021-11-23T16:29:18 No new trace in the past 2 min(s).
2021-11-23T16:30:18 No new trace in the past 3 min(s).
2021-11-23T16:31:33.612 [Information] Executing 'Functions.M2U8-BlobTrigger' (Reason='New blob detected: samples-workitems/HITACHI.pdf', Id=2ec459f0-41b0-48ea-aa6c-95257056cdd1)
2021-11-23T16:31:33.613 [Information] Trigger Details: MessageId: 6d11d766-f153-41d0-9b85-fa798f2f1827, DequeueCount: 1, InsertionTime: 2021-11-23T16:31:33.000+00:00, BlobCreated: 2021-11-23T16:31:30.000+00:00, BlobLastModified: 2021-11-23T16:31:30.000+00:00
2021-11-23T16:31:33.651 [Information] JavaScript blob trigger function processed blobBlob: samples-workitems/HITACHI.pdfBlob Size: 371576 Bytes
2021-11-23T16:31:33.652 [Information] Executed 'Functions.M2U8-BlobTrigger' (Succeeded, Id=2ec459f0-41b0-48ea-aa6c-95257056cdd1, Duration=124ms)
16°C
上午 12:31
2021/11/24

04 Chain Azure Functions together using input and output bindings

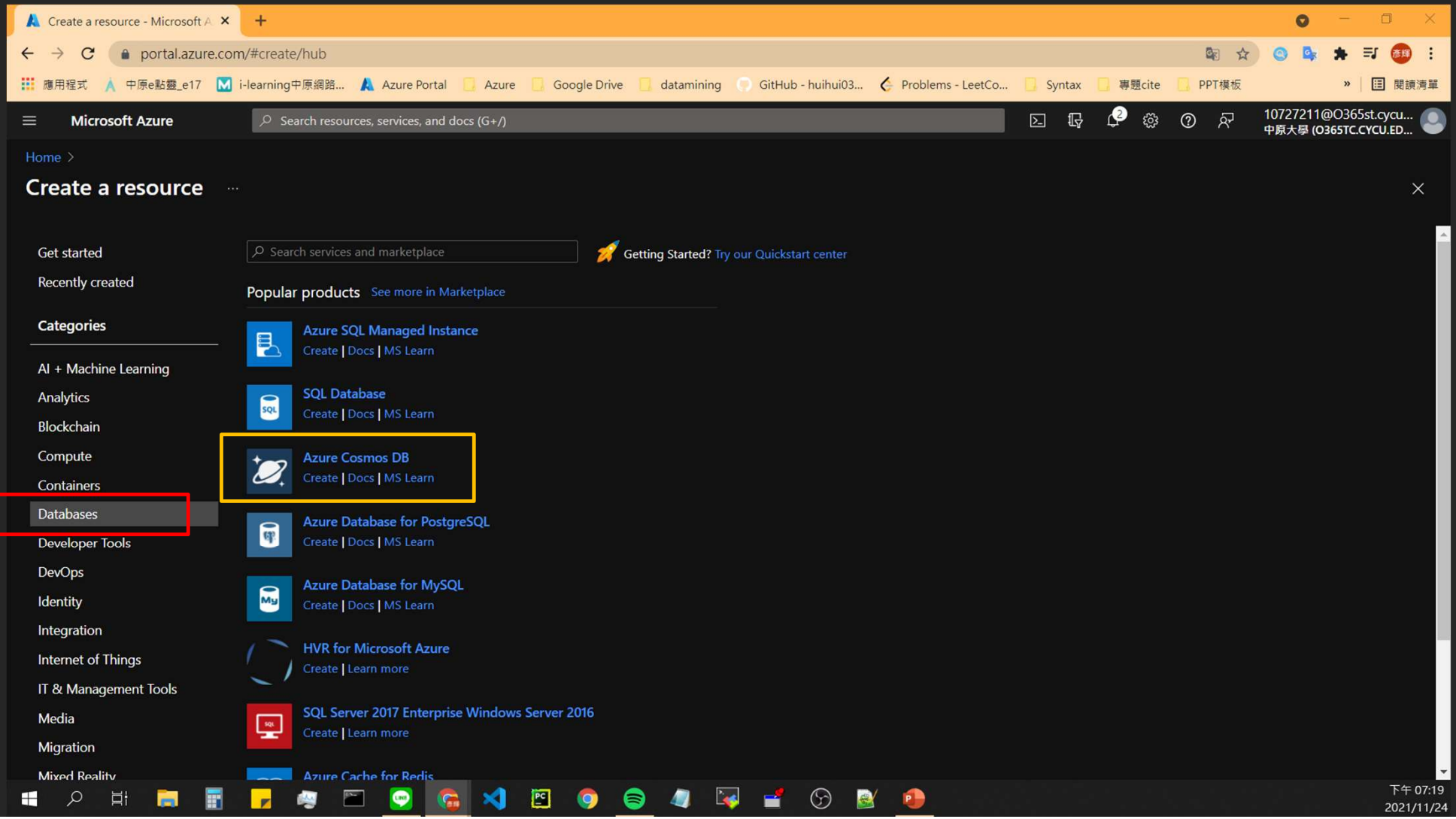
Abstract


Azure
CosmosDB
Function Url
Http Trigger
Azure Queue Storage

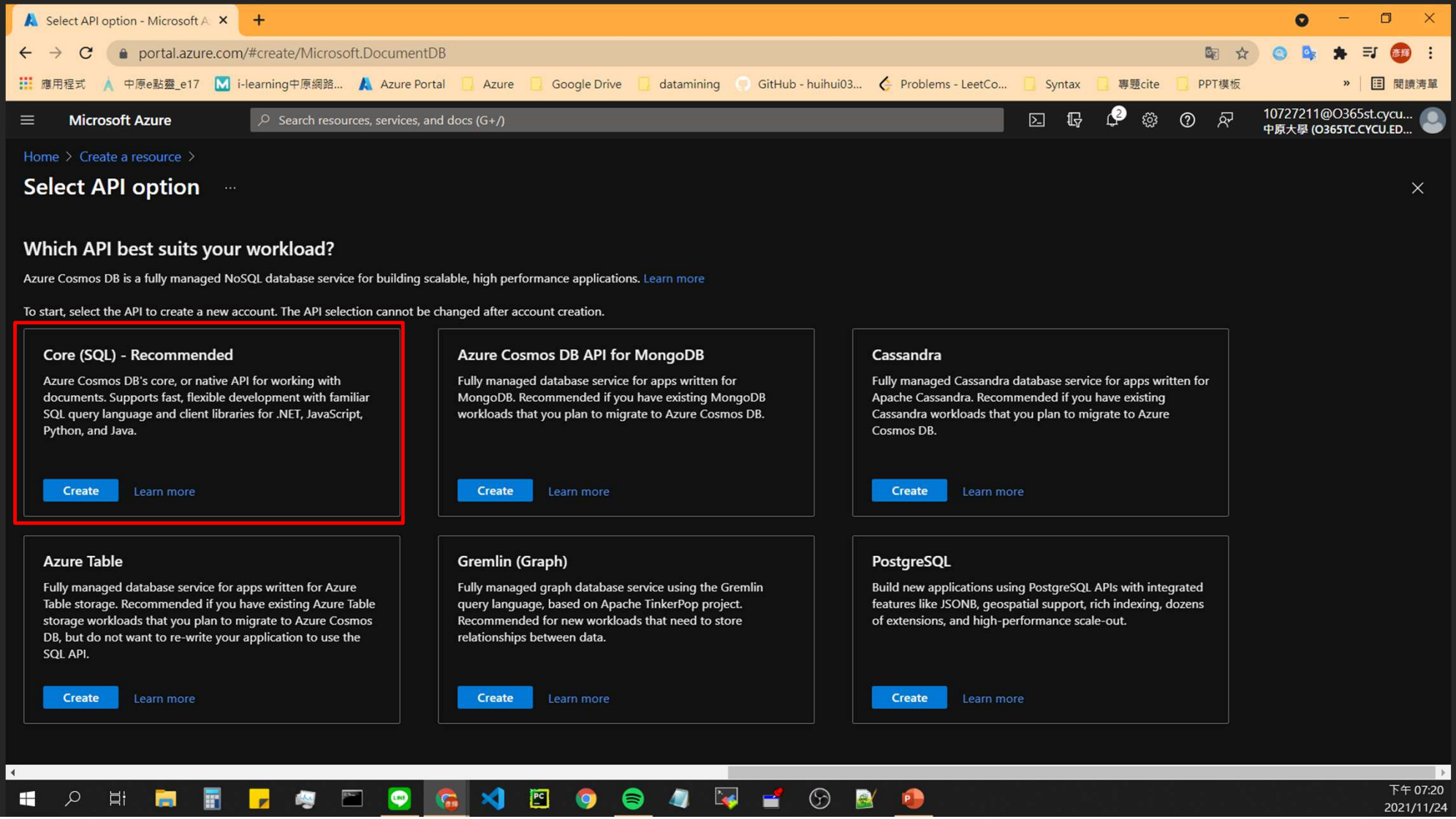
Create a http trigger function



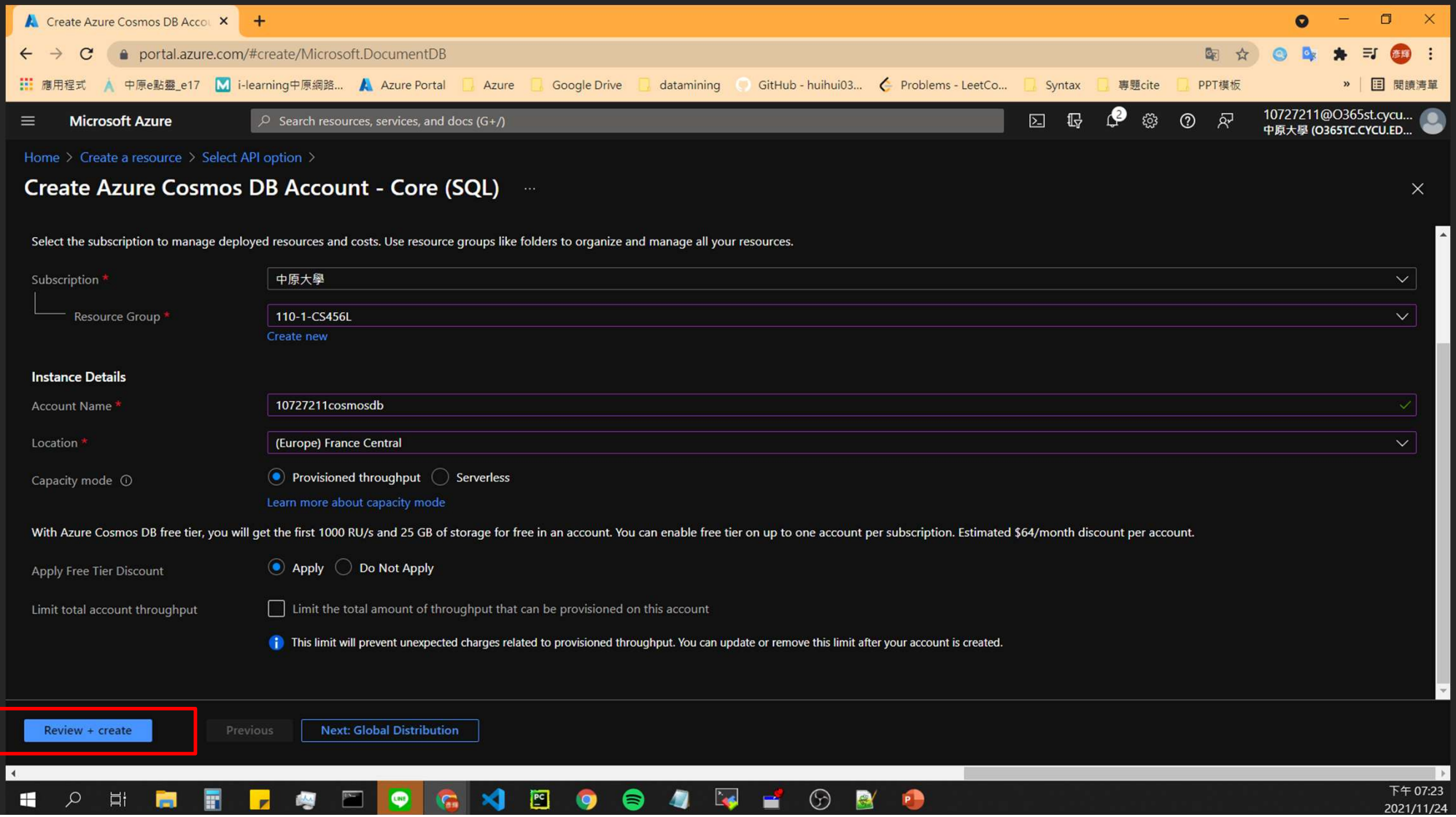
Create Azure CosmosDB - 1



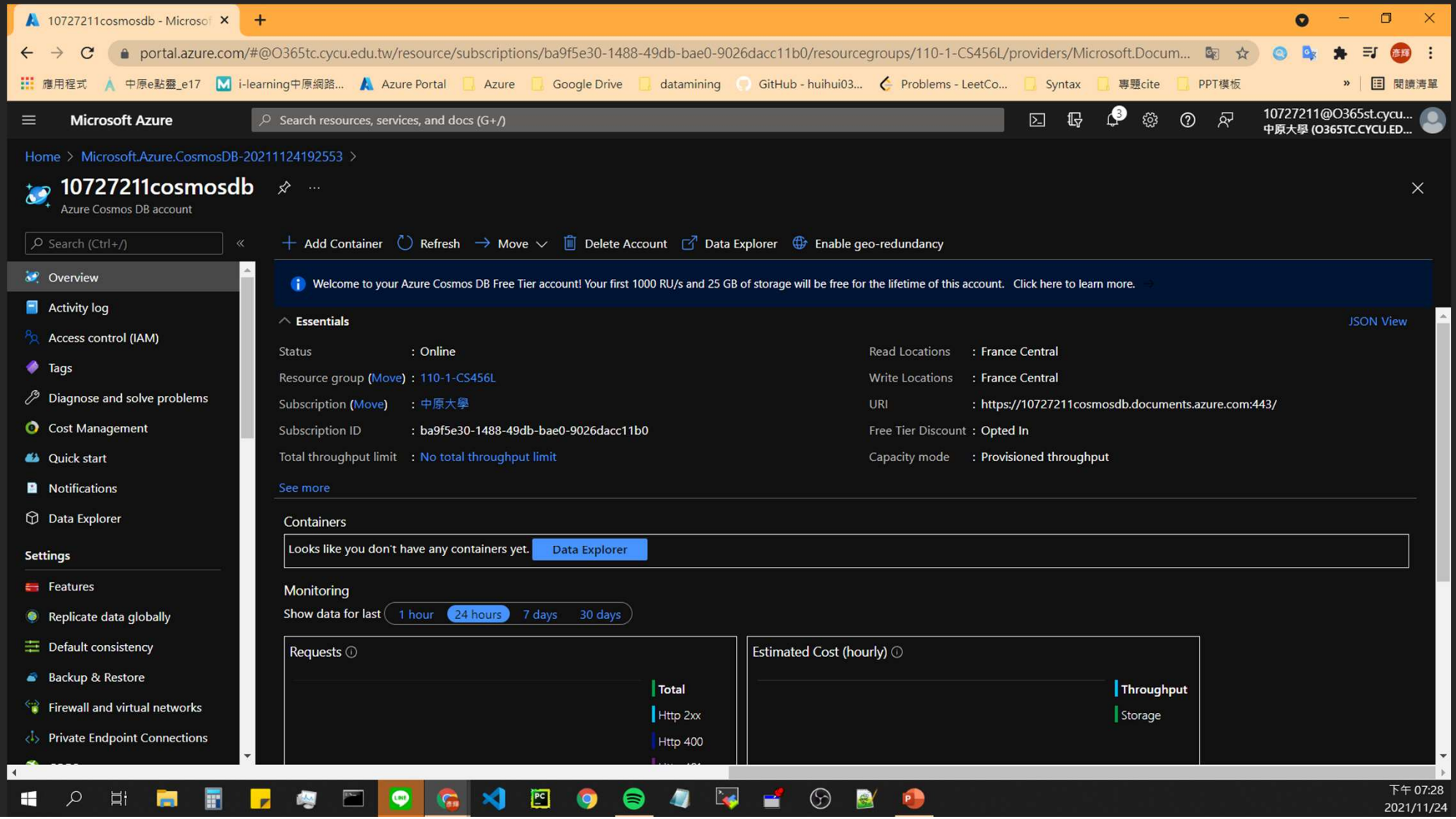
Create Azure CosmosDB - 2



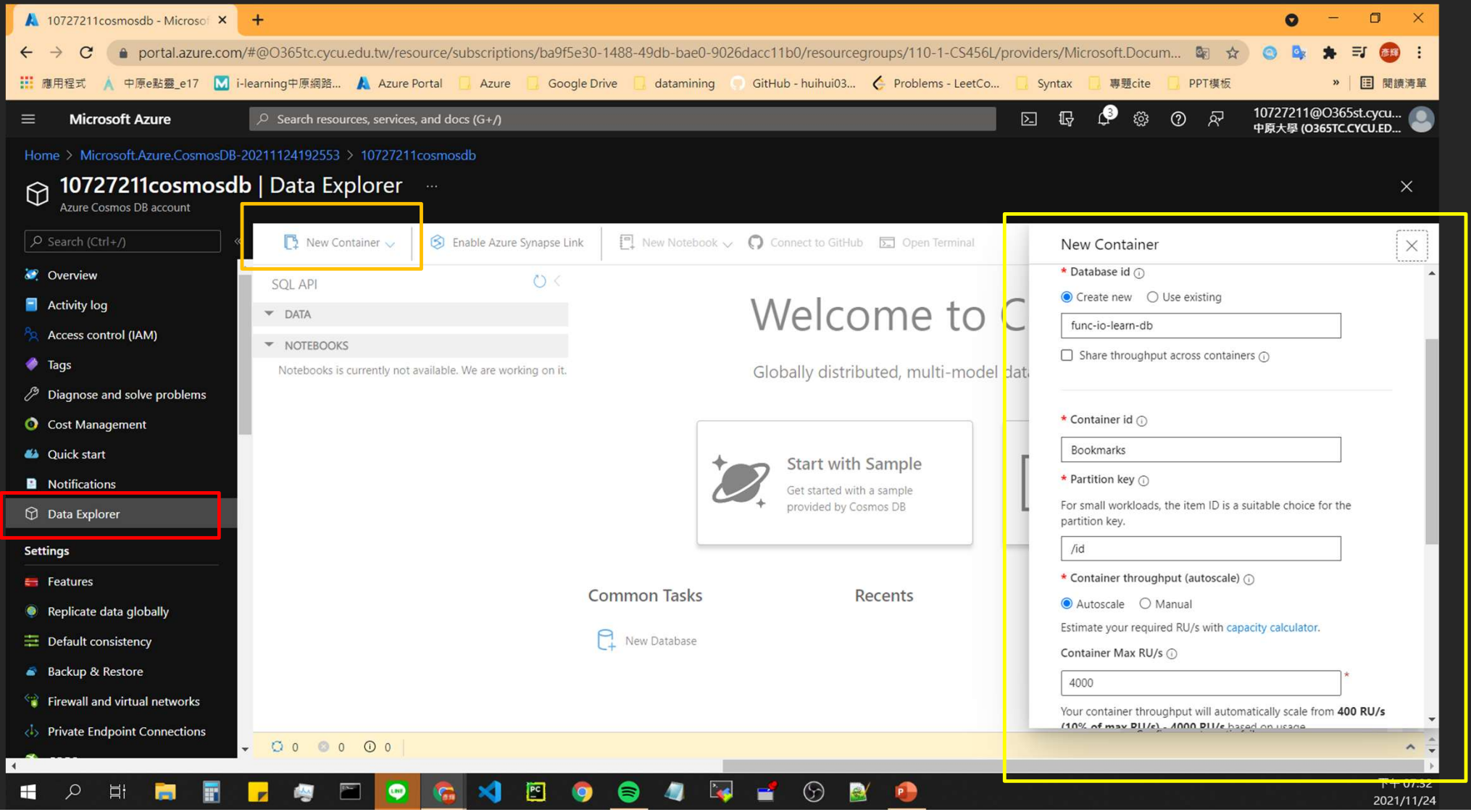
Create Azure CosmosDB - 3



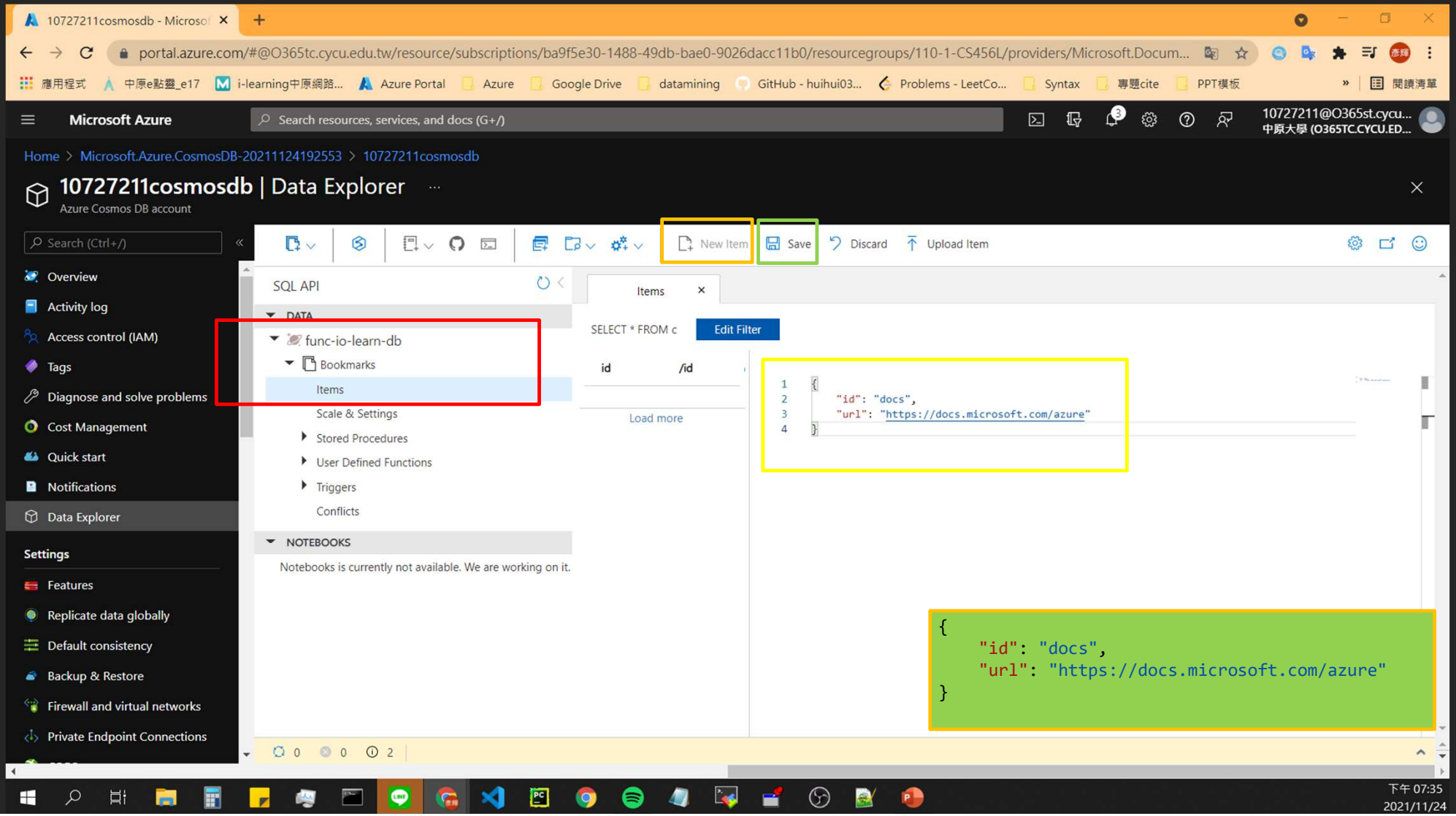
Create Azure CosmosDB - Result



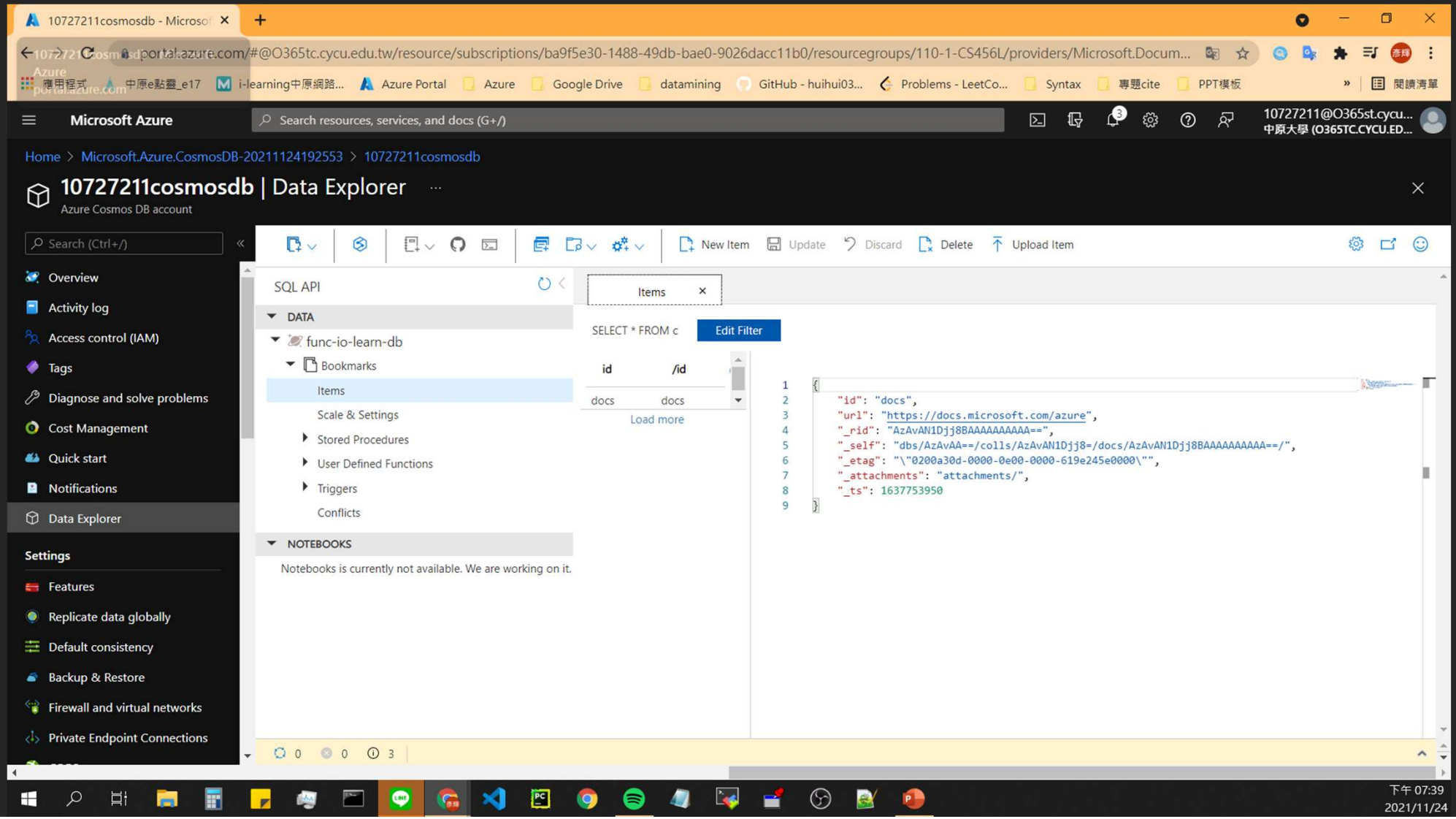
Add a Container



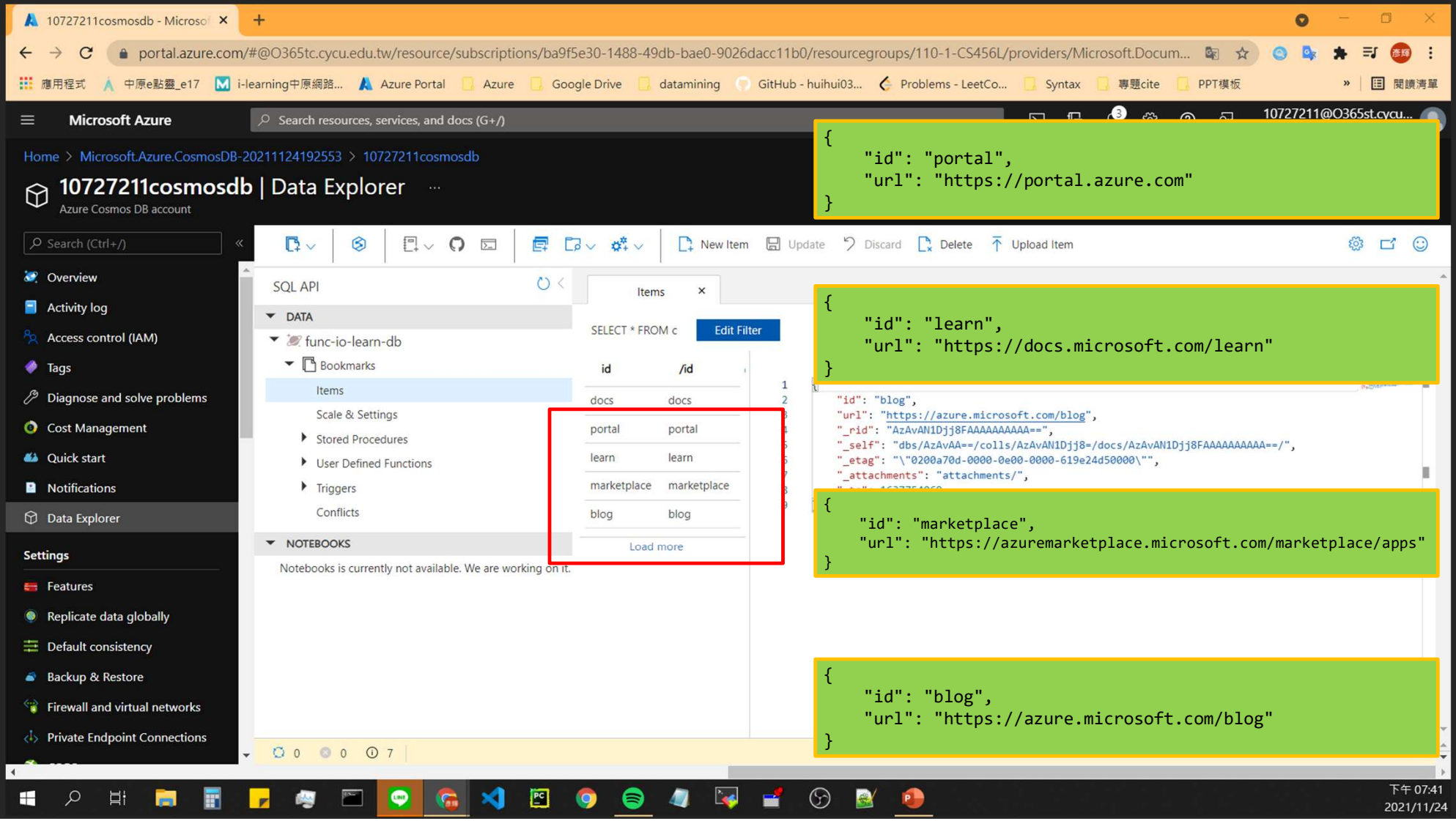
Add test data - 1



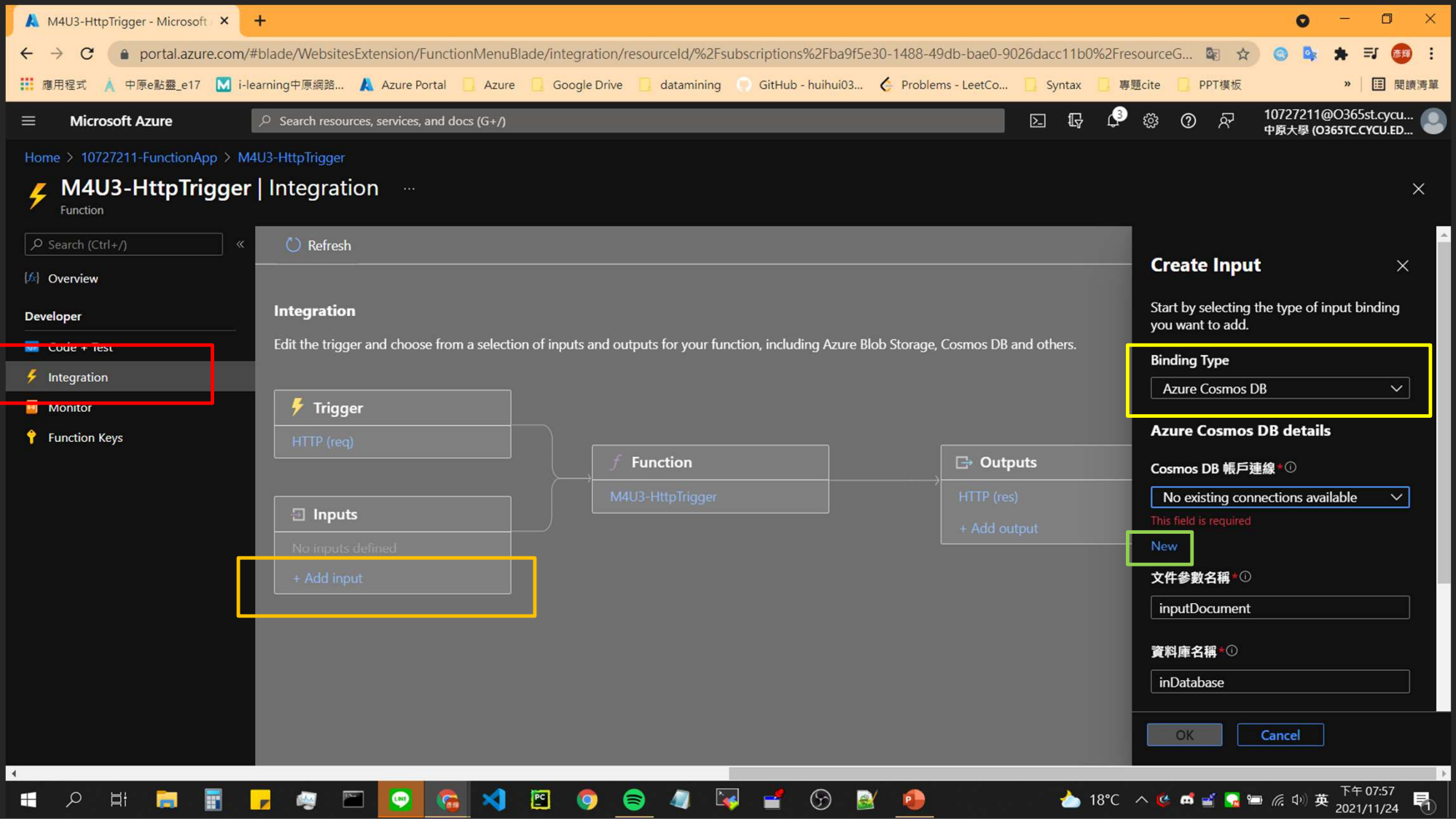
Add test data - 2



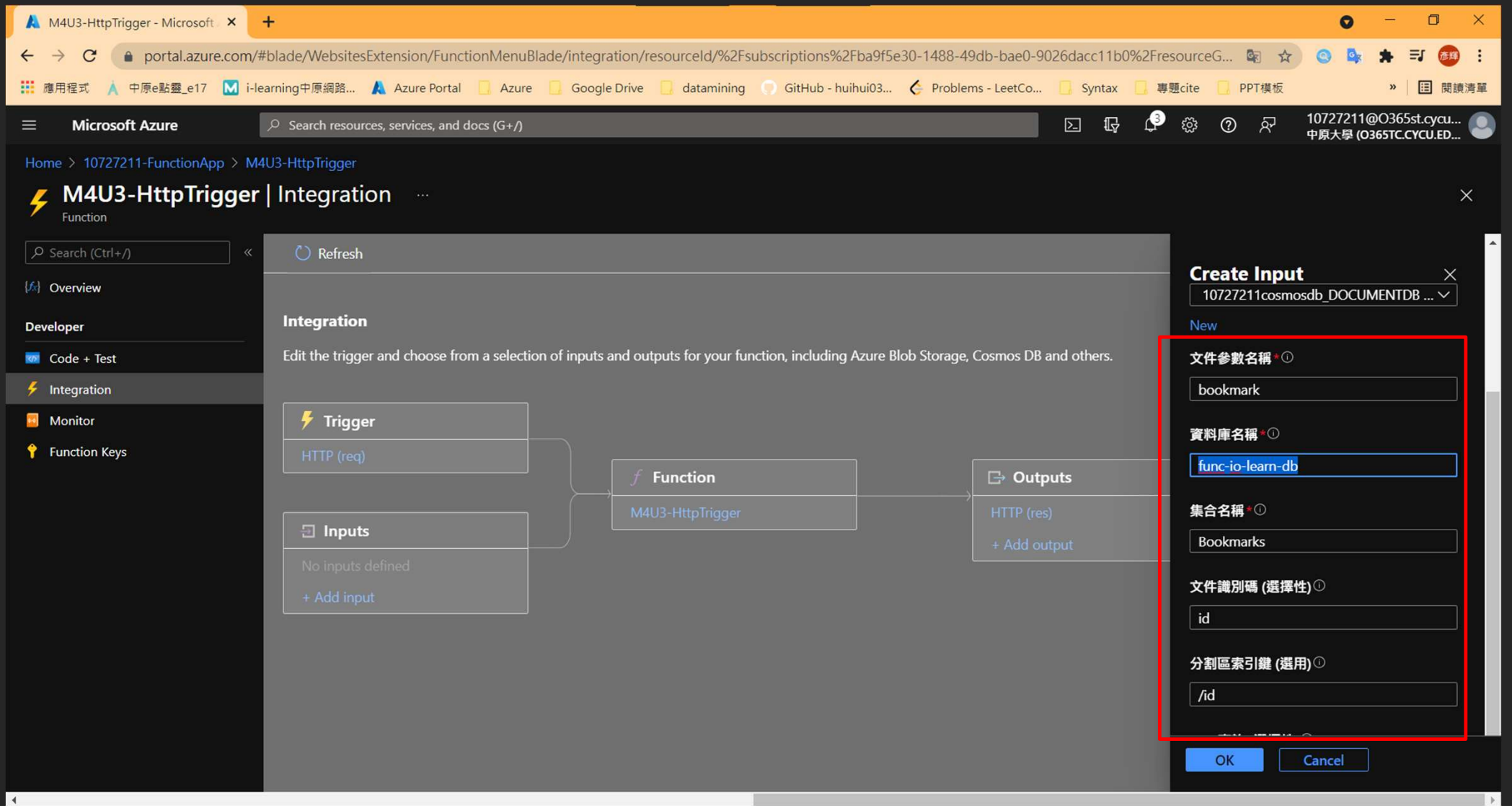
Add test data - 3



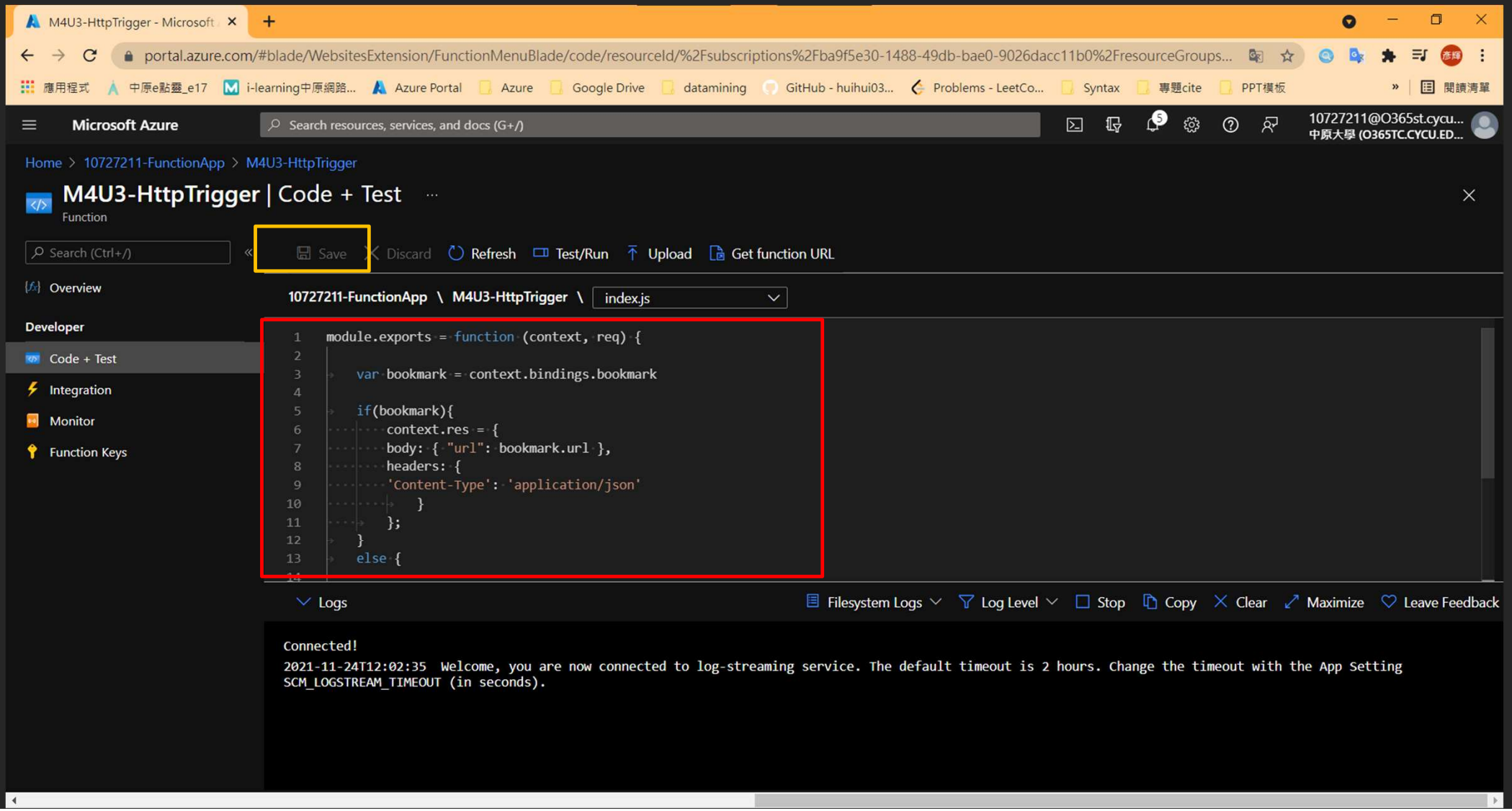
Add an Azure Cosmos DB input binding -1



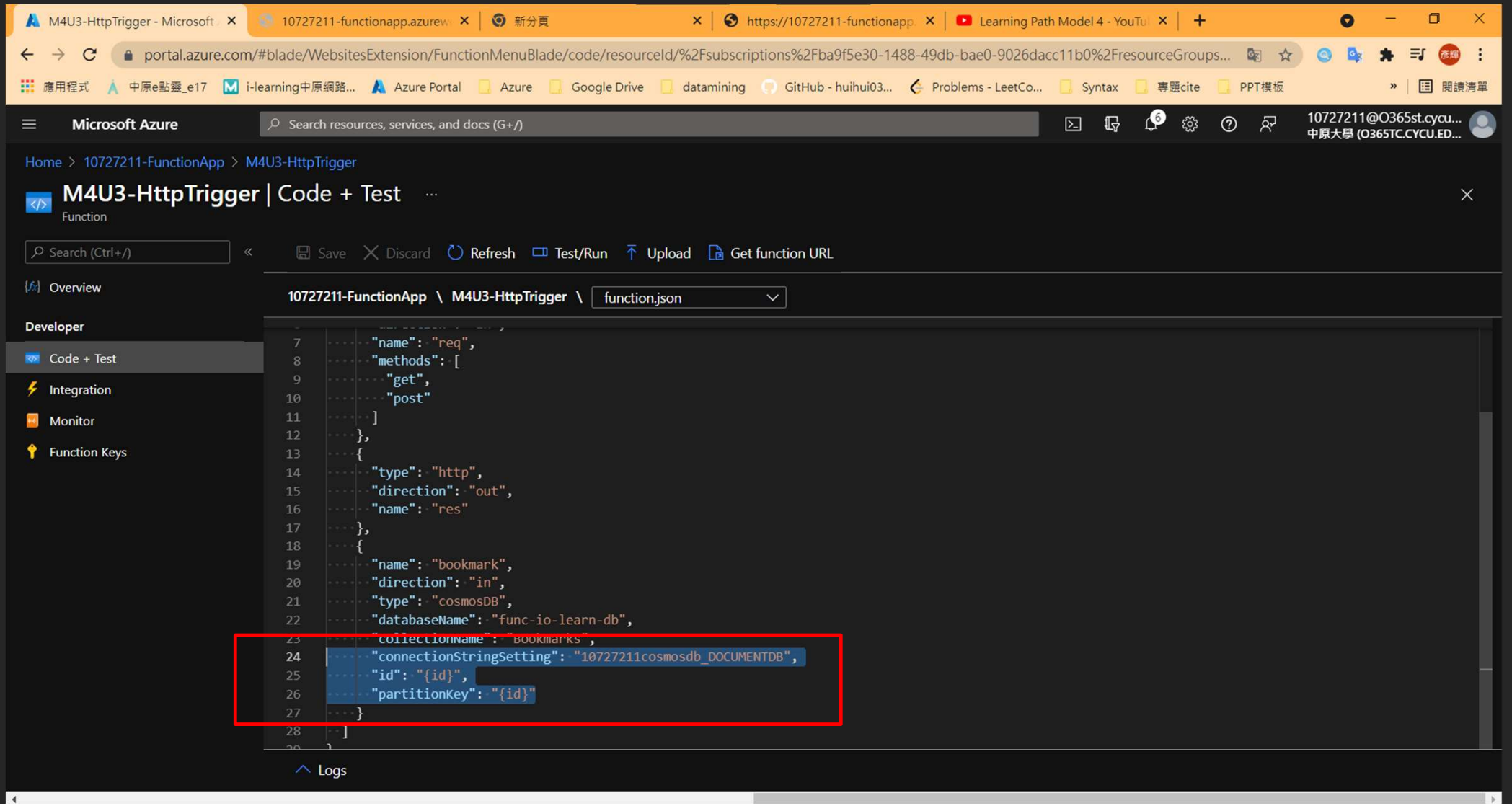
Add an Azure Cosmos DB input binding -2



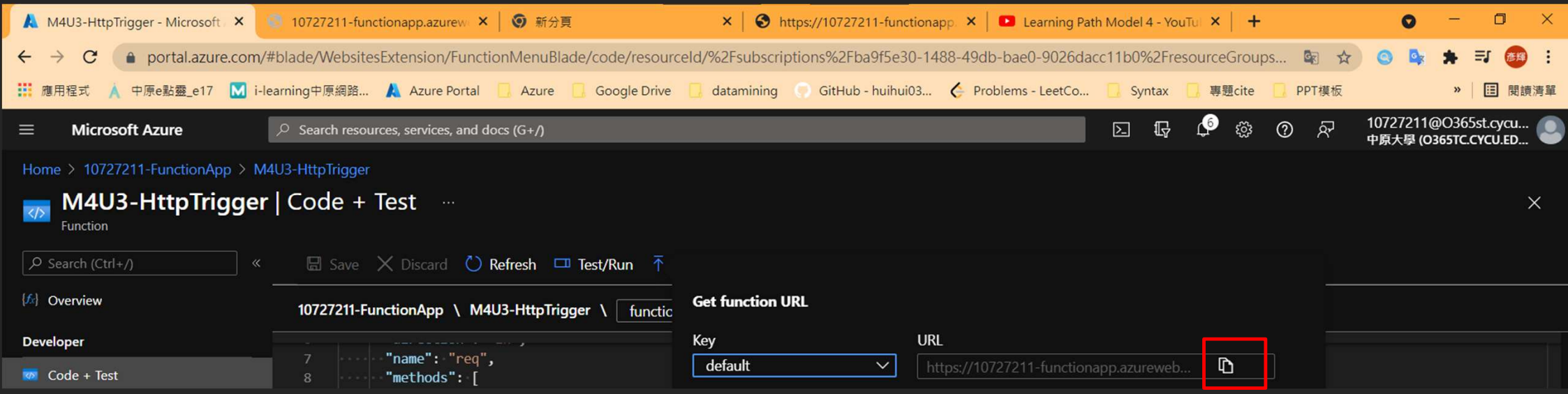
Replace index.js

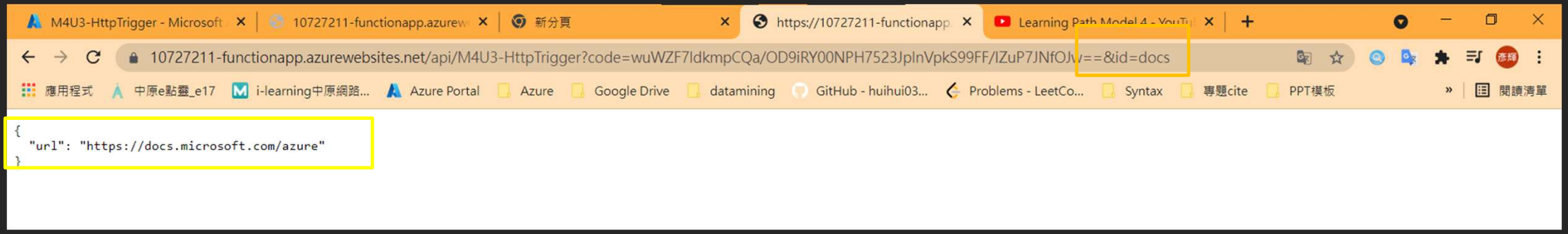


Replace function.json



Result


M4U3-HttpTrigger - Microsoft
10727211-functionapp.azurew
新分頁
https://10727211-functionapp
Learning Path Model 4 - YouTu
portal.azure.com/#blade/WebsitesExtension/FunctionMenuBlade/code/resourceId/%2Fsubscriptions%2Fba9f5e30-1488-49db-bae0-9026dacc11b0%2FresourceGroups...
應用程式
中原e點靈_e17
i-learning中原網路...
Azure Portal
Azure
Google Drive
datamining
GitHub - huihui03...
Problems - LeetCo...
Syntax
專題cite
PPT模板
閱讀清單
Microsoft Azure
Search resources, services, and docs (G+/)
10727211@O365st.cycu...
中原大學 (O365TC.CYCU.ED...
Home > 10727211-FunctionApp > M4U3-HttpTrigger
M4U3-HttpTrigger | Code + Test
Function
Search (Ctrl+/)
Save
Discard
Refresh
Test/Run
Overview
Developer
Code + Test
10727211-FunctionApp \ M4U3-HttpTrigger \ functic
7 "name": "req",
8 "methods": [
Get function URL
Key
default
URL
https://10727211-functionapp.azureweb...


M4U3-HttpTrigger - Microsoft
10727211-functionapp.azurew
新分頁
https://10727211-functionapp
Learning Path Model 4 - YouTu
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應用程式
中原e點靈_e17
i-learning中原網路...
Azure Portal
Azure
Google Drive
datamining
GitHub - huihui03...
Problems - LeetCo...
Syntax
專題cite
PPT模板
閱讀清單
{
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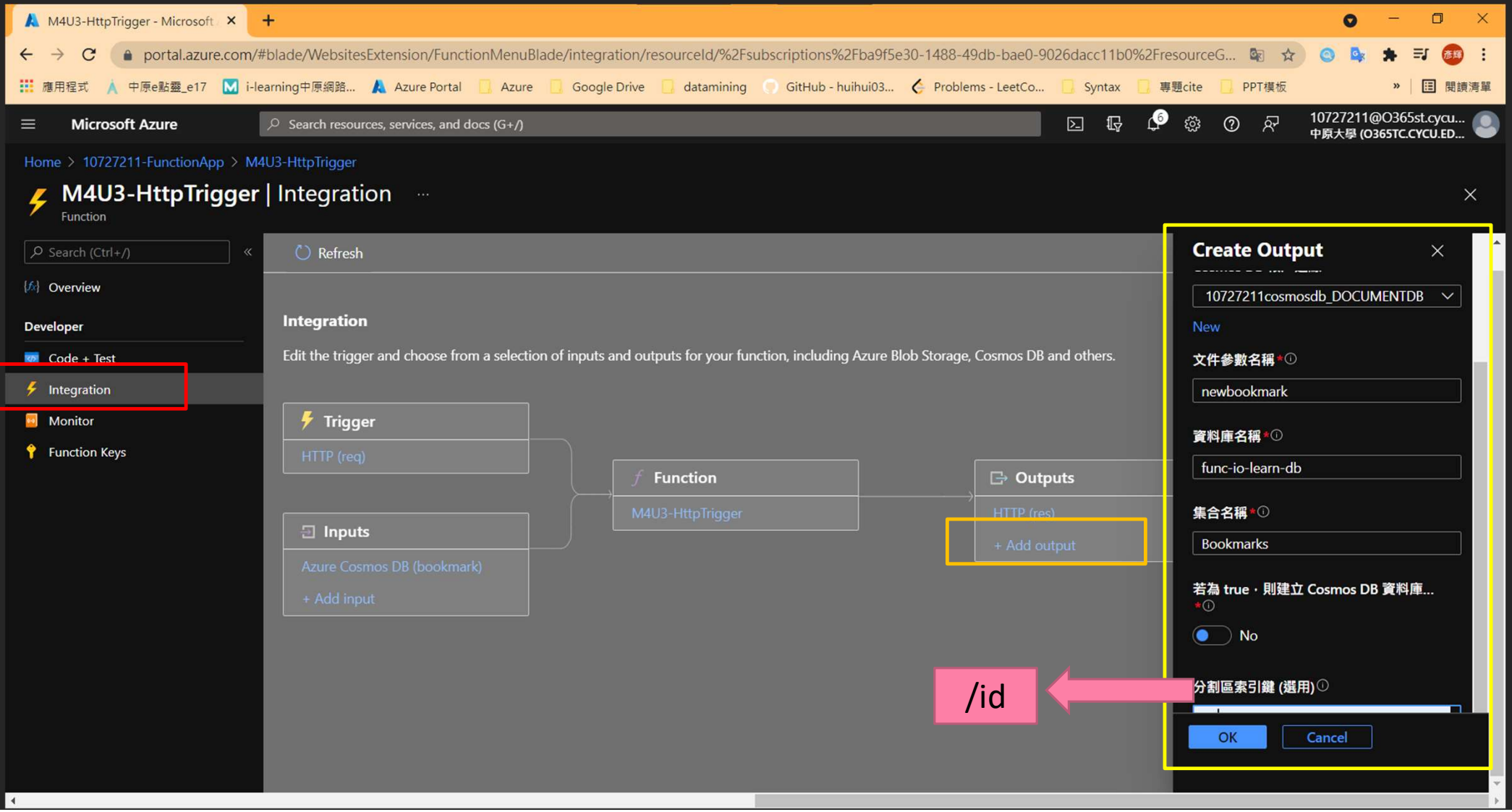
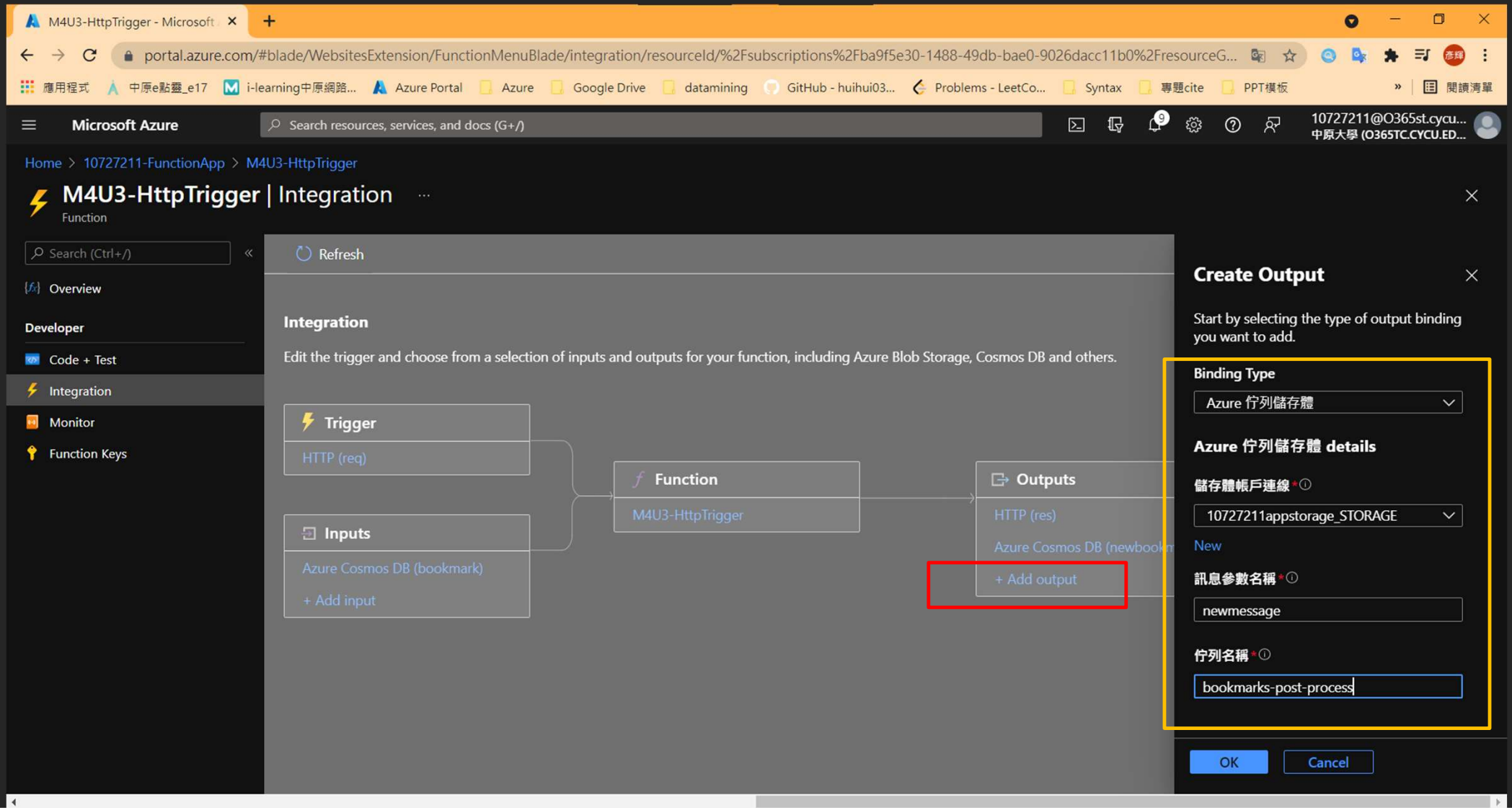
}

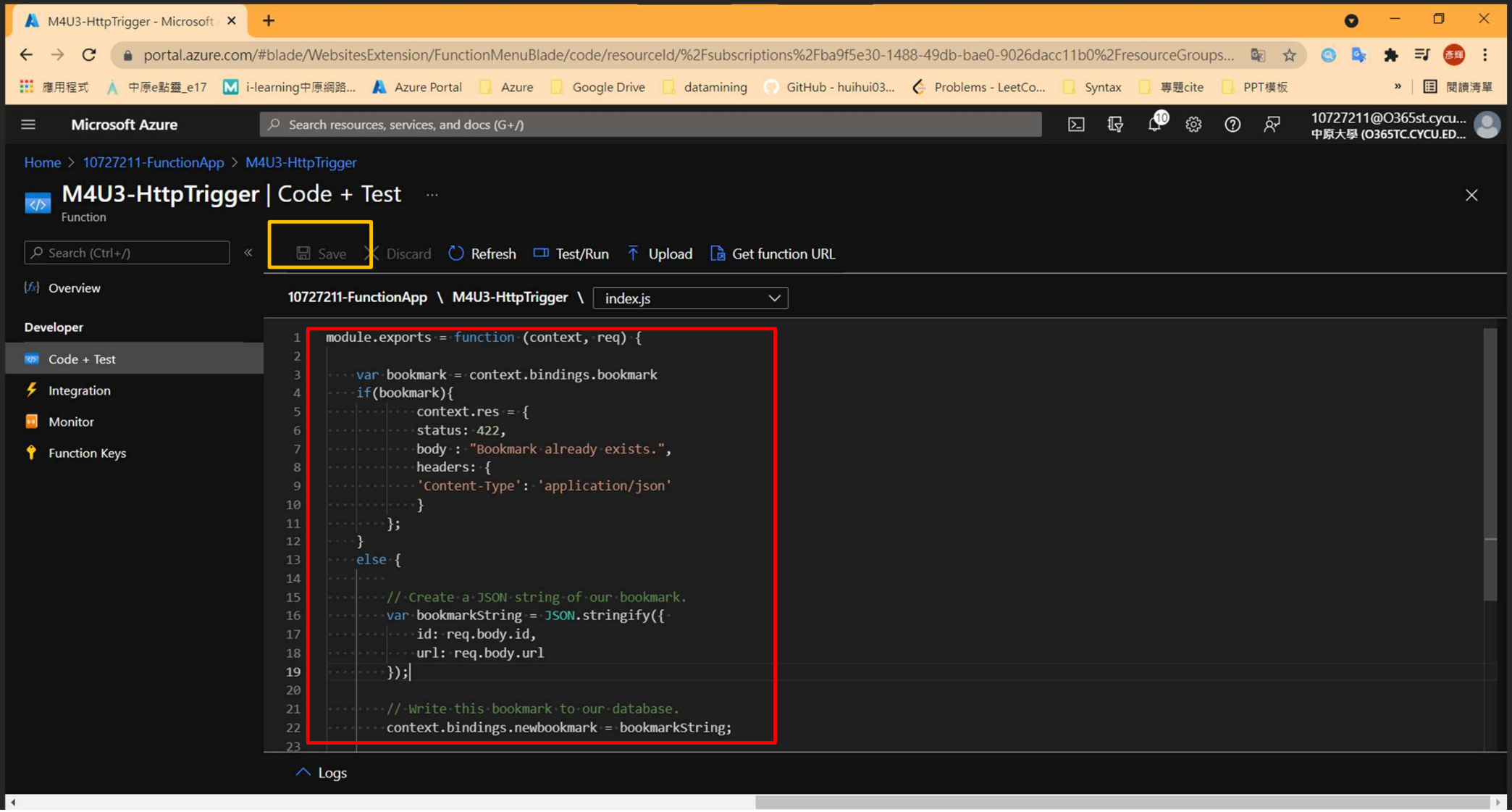
Result


M4U3-HttpTrigger - Microsoft
portal.azure.com/#blade/WebsitesExtension/FunctionMenuBlade/integration/resourceId/%2Fsubscriptions%2Fba9f5e30-1488-49db-bae0-9026dacc11b0%2FresourceG...
Microsoft Azure
Search resources, services, and docs (G+/)
10727211@O365st.cycu...
中原大學 (O365TC.CYCU.ED...
Home > 10727211-FunctionApp > M4U3-HttpTrigger
M4U3-HttpTrigger | Integration
Function
Search (Ctrl+/)
Overview
Developer
Code + Test
Integration
Monitor
Function Keys
Refresh
Integration
Edit the trigger and choose from a selection of inputs and outputs for your function, including Azure Blob Storage, Cosmos DB and others.
Trigger
HTTP (req)
Inputs
Azure Cosmos DB (bookmark)
+ Add input
Function
M4U3-HttpTrigger
Outputs
HTTP (res)
+ Add output
Create Output
10727211cosmosdb_DOCUMENTDB
New
文件參數名稱 *
newbookmark
資料庫名稱 *
func-io-learn-db
集合名稱 *
Bookmarks
若為 true，則建立 Cosmos DB 資料庫... *
No
分割區索引鍵 (選用)
/id
OK
Cancel

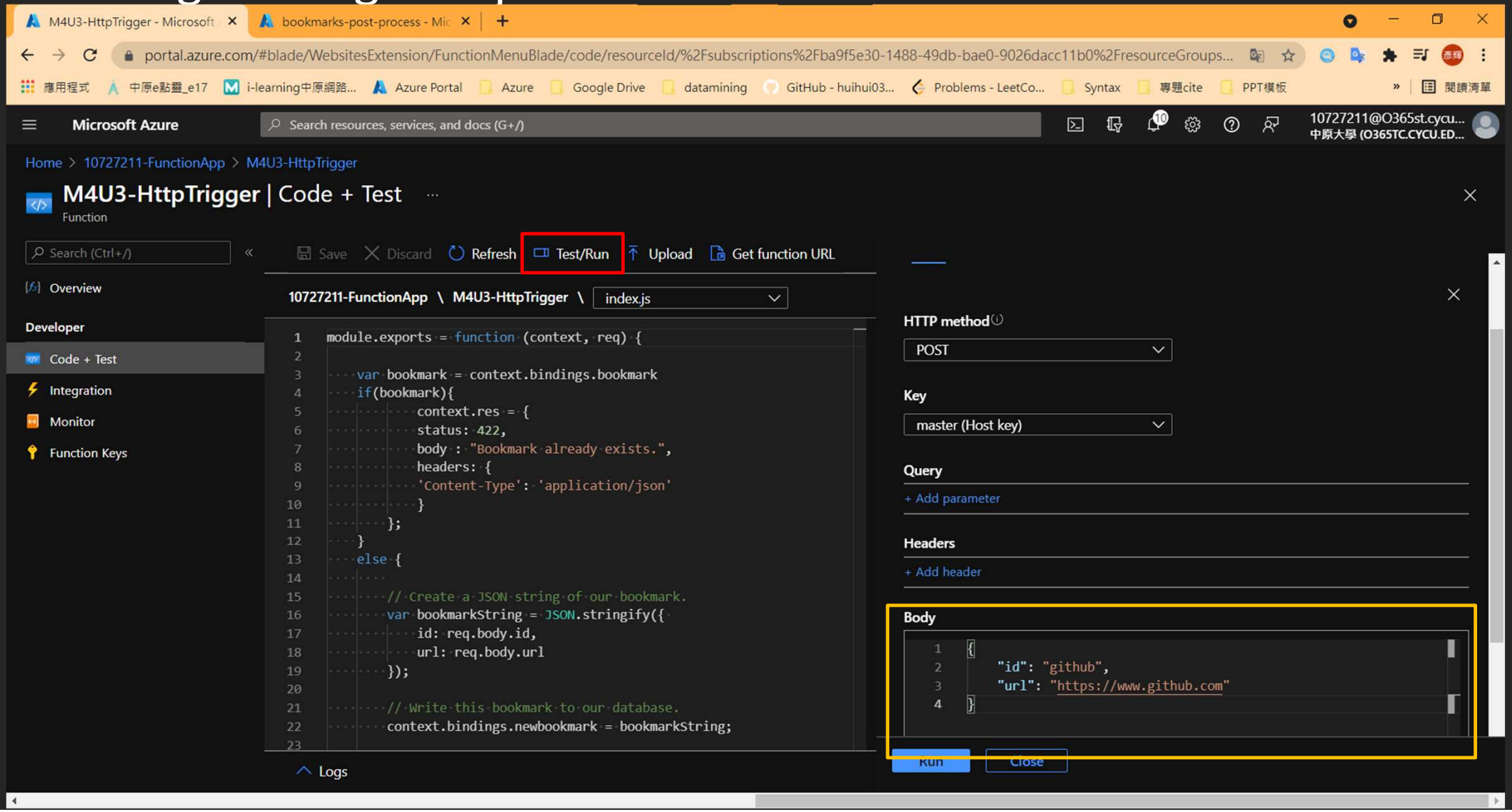
Add an Azure Queue Storage output binding



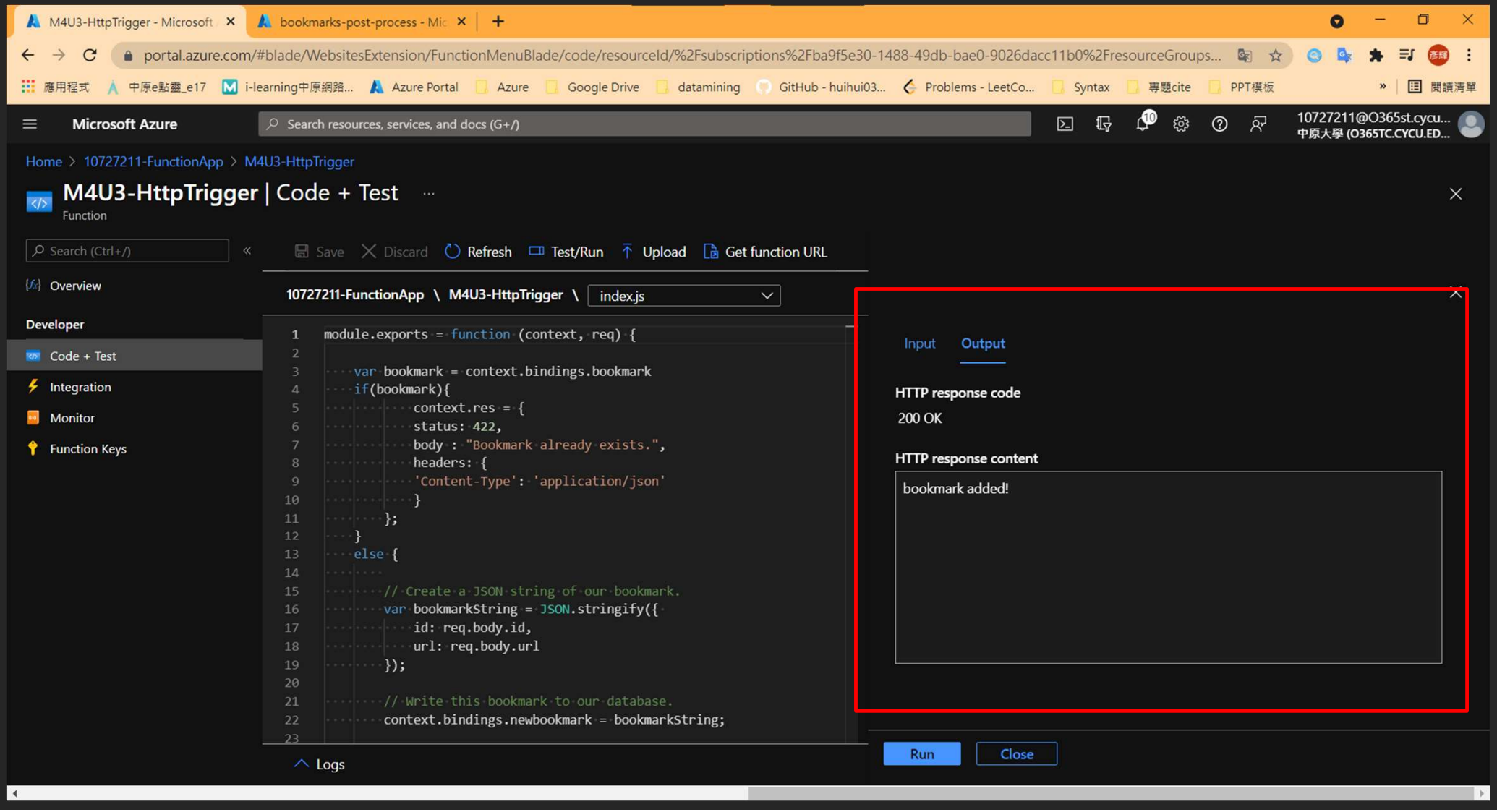
Replace index.js



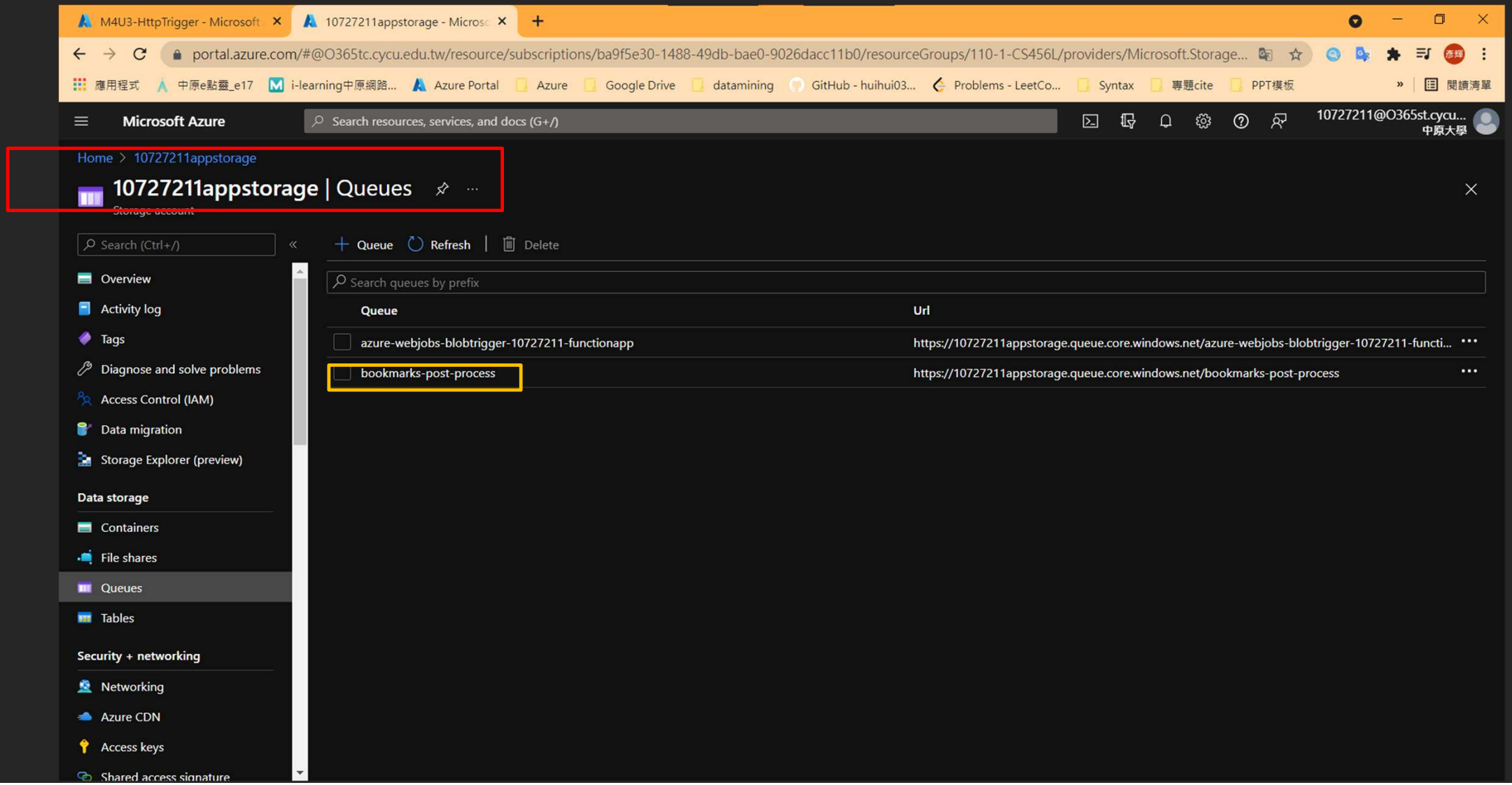
Writing message to queue - 1



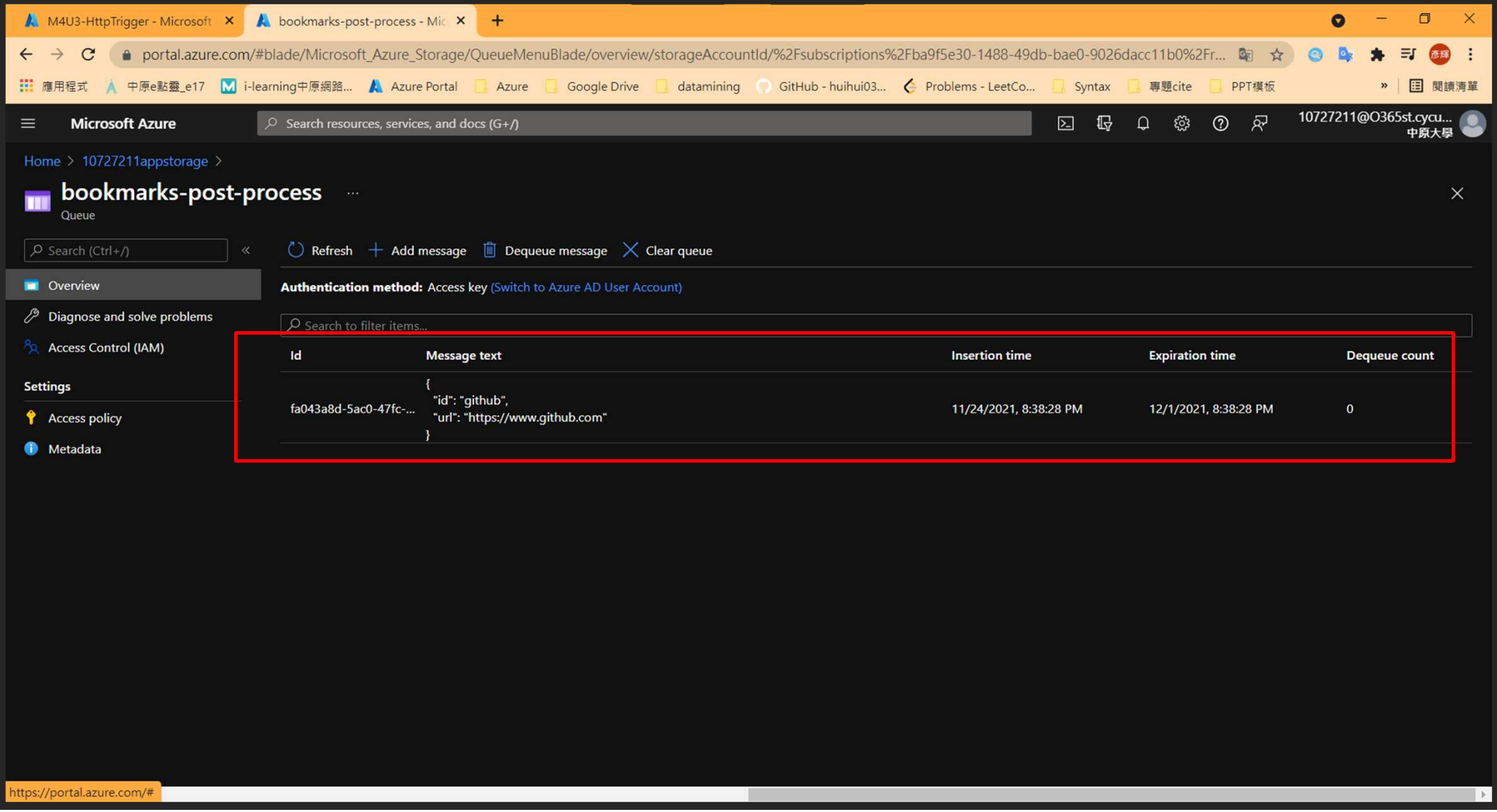
Writing message to queue - 2



Verify that a message is written to the queue - 1

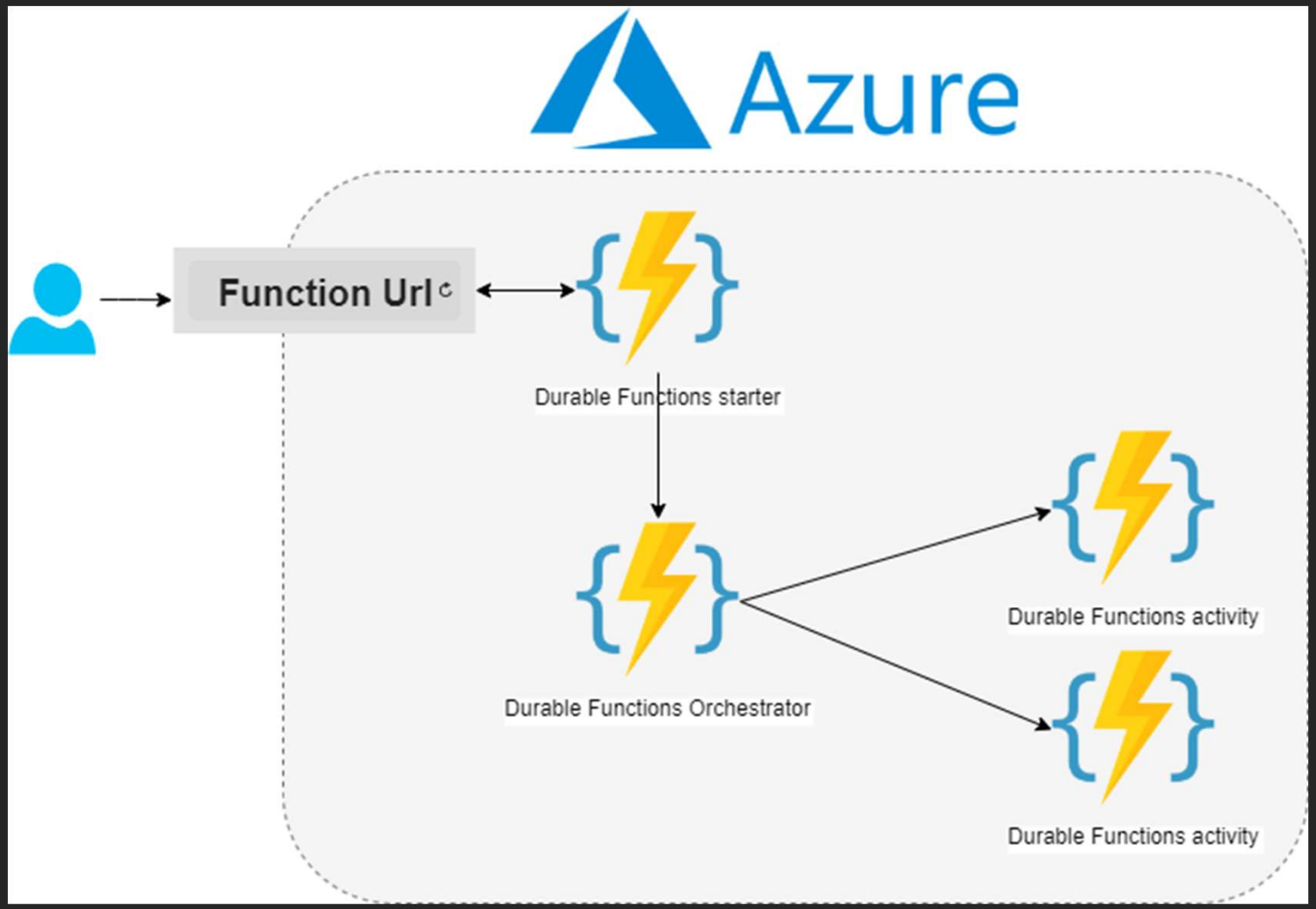


Verify that a message is written to the queue - 2

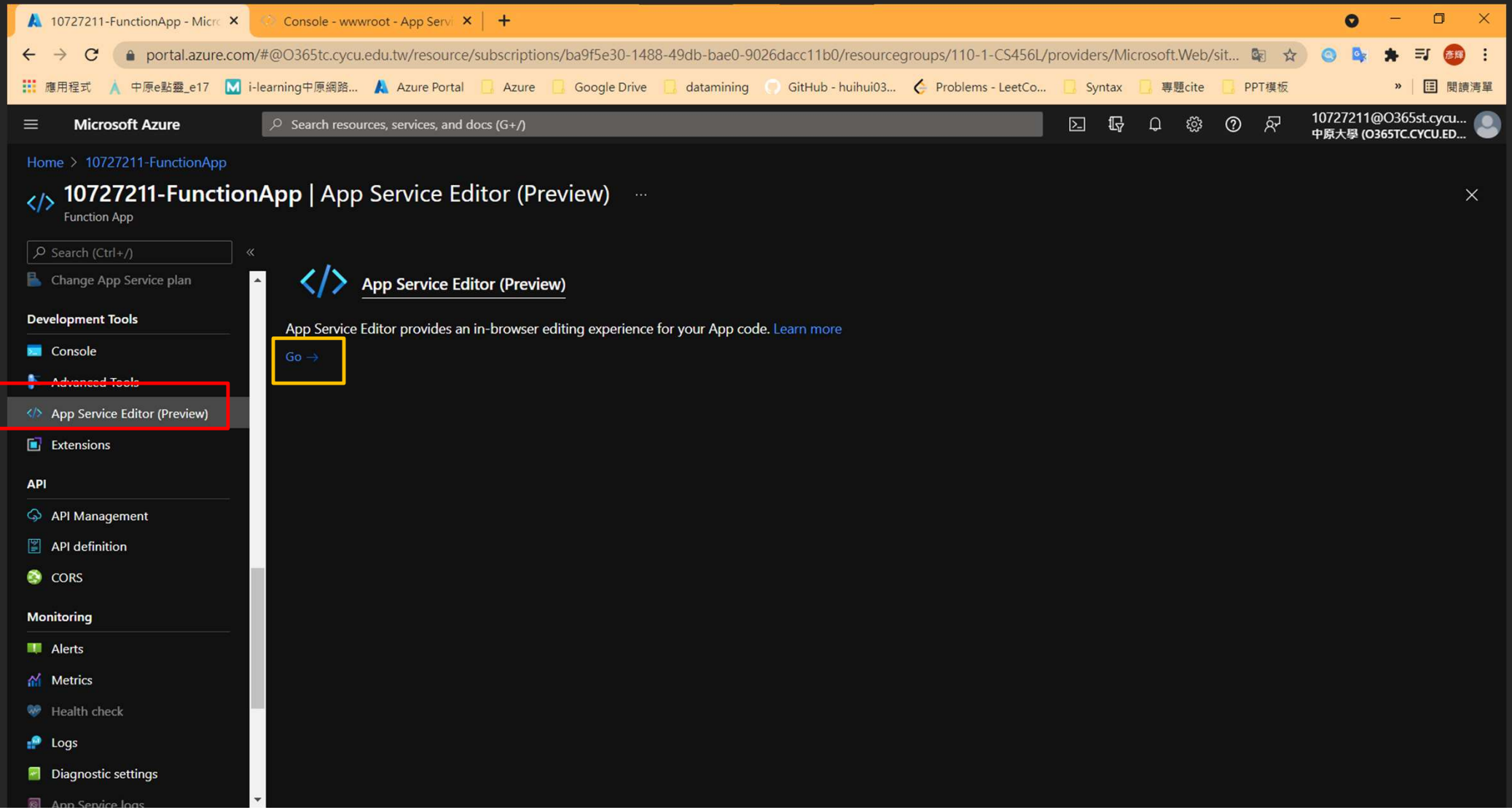


05 Create a long-running serverless workflow with Durable Functions

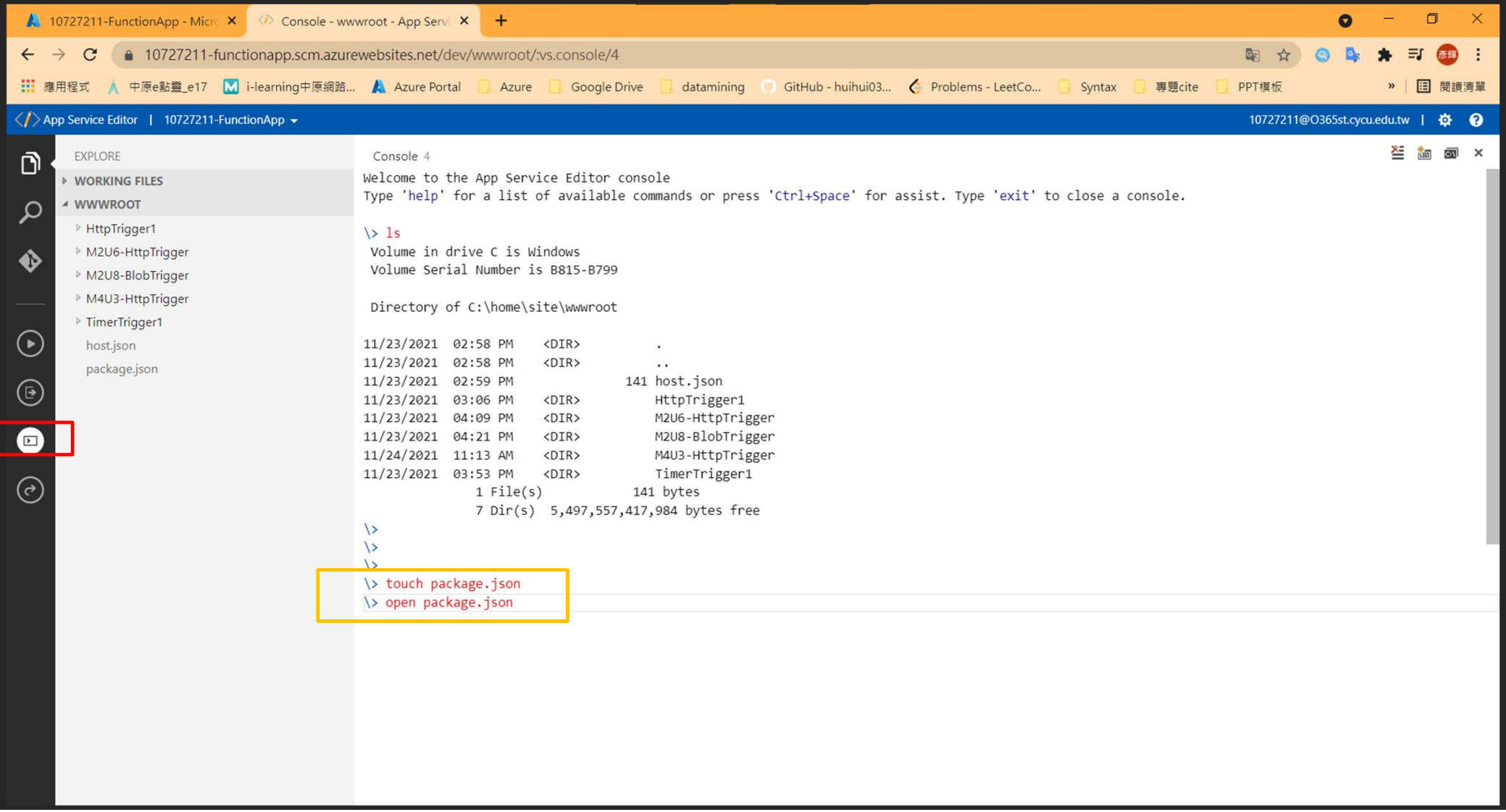
Abstract


Azure
Function Url
Durable Functions starter
Durable Functions Orchestrator
Durable Functions activity
Durable Functions activity

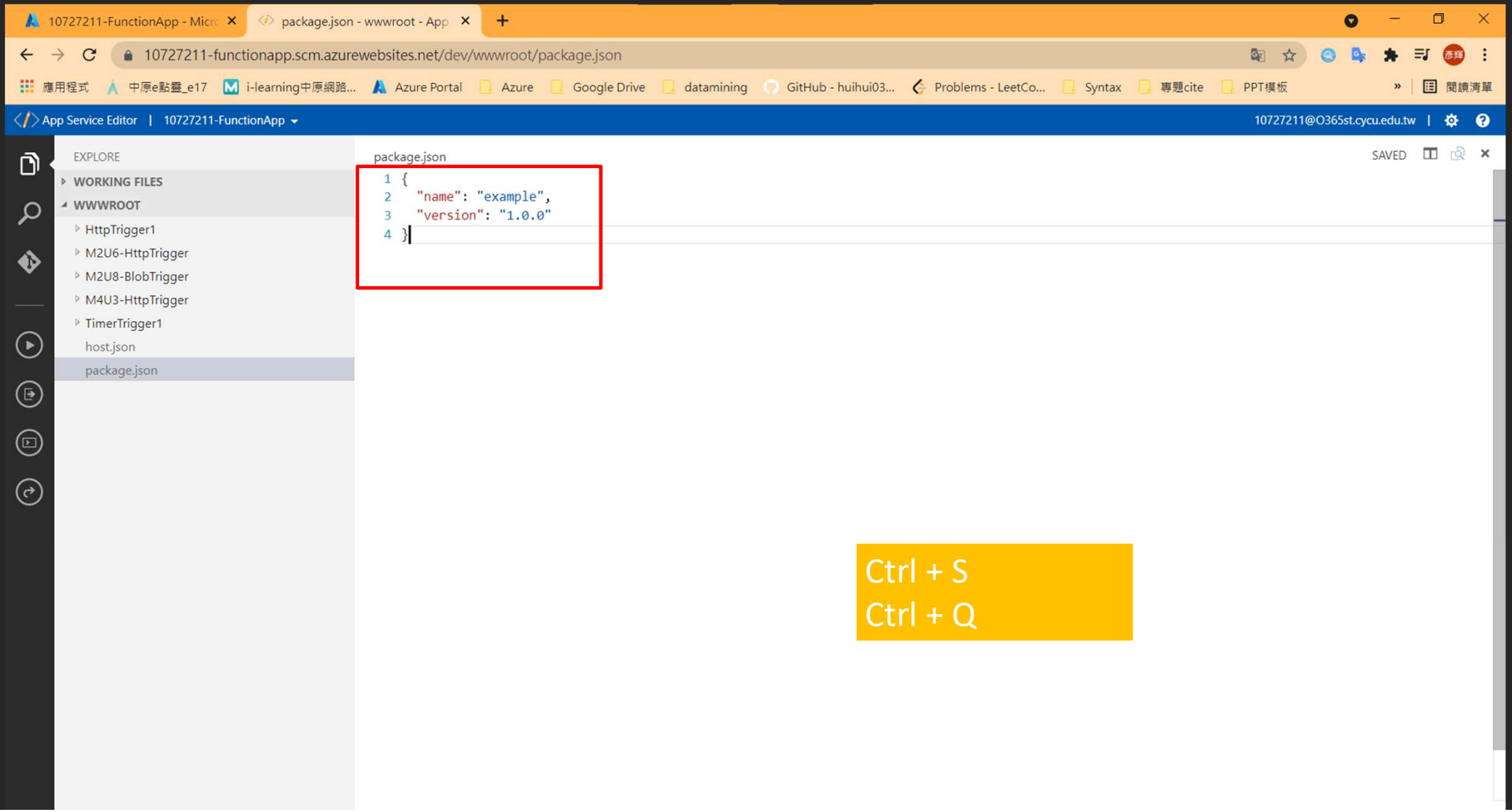
Install the durable-functions npm package - 1



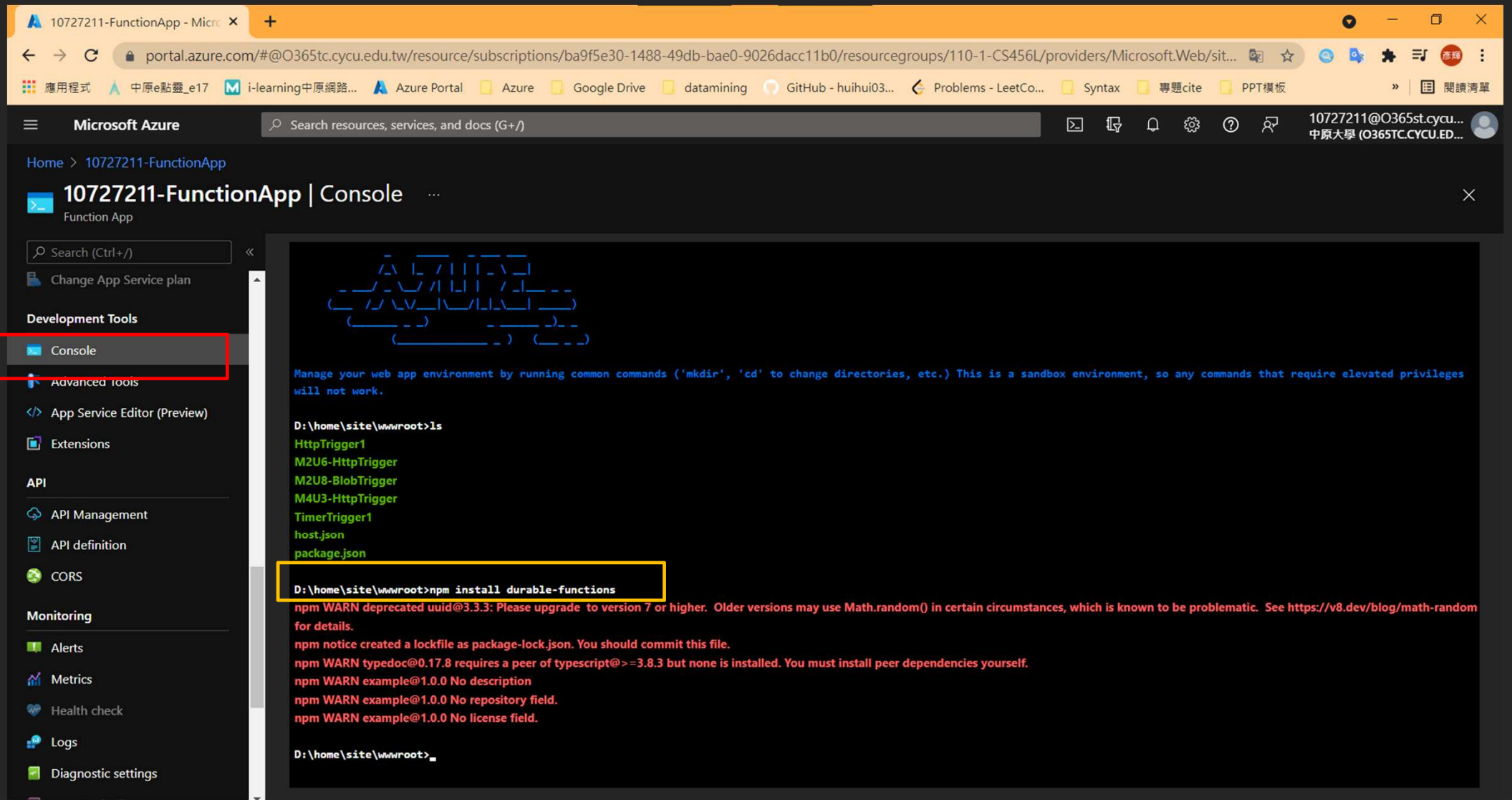
Install the durable-functions npm package - 2



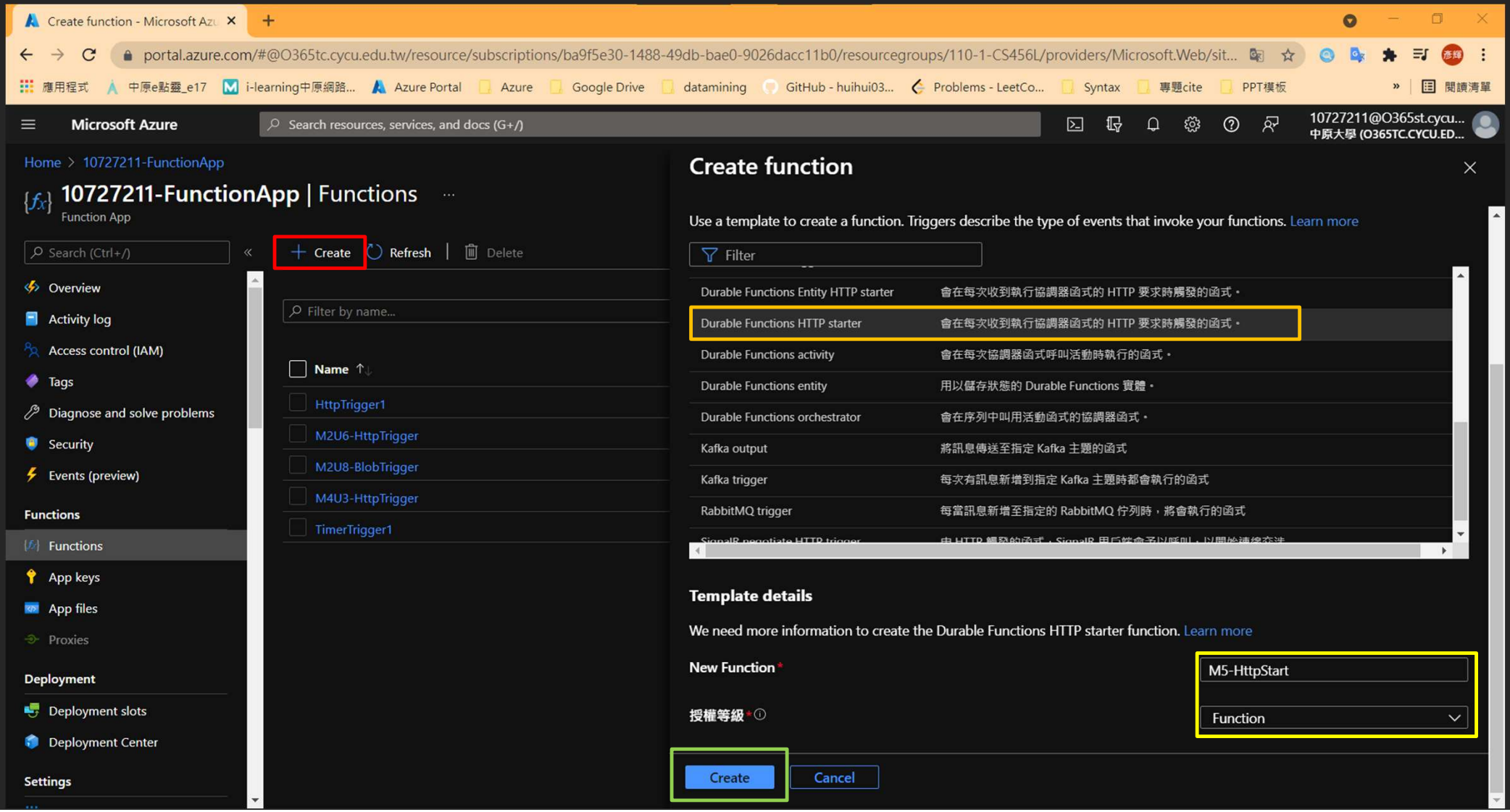
Install the durable-functions npm package - 3



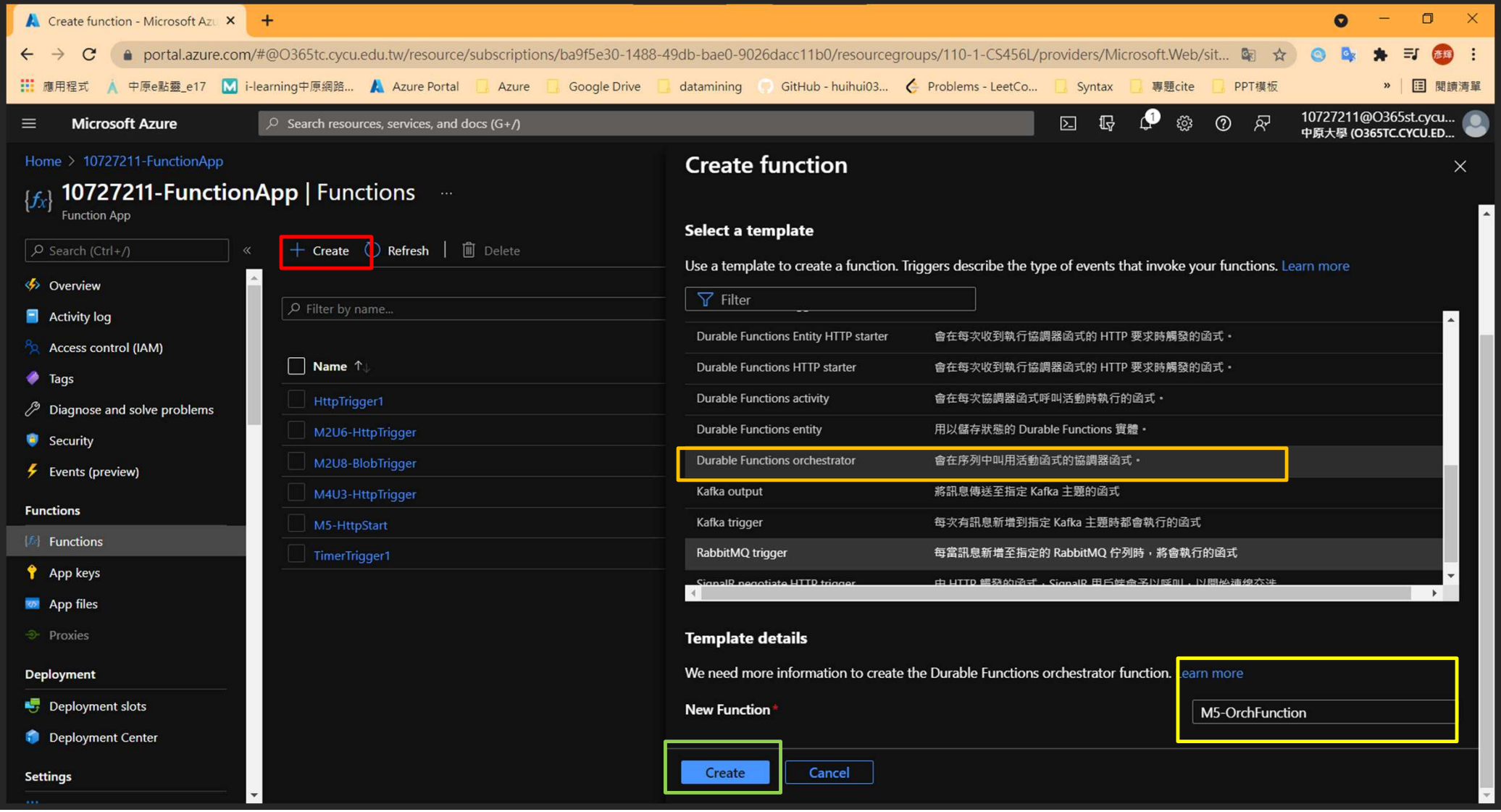
Install the durable-functions npm package – 4



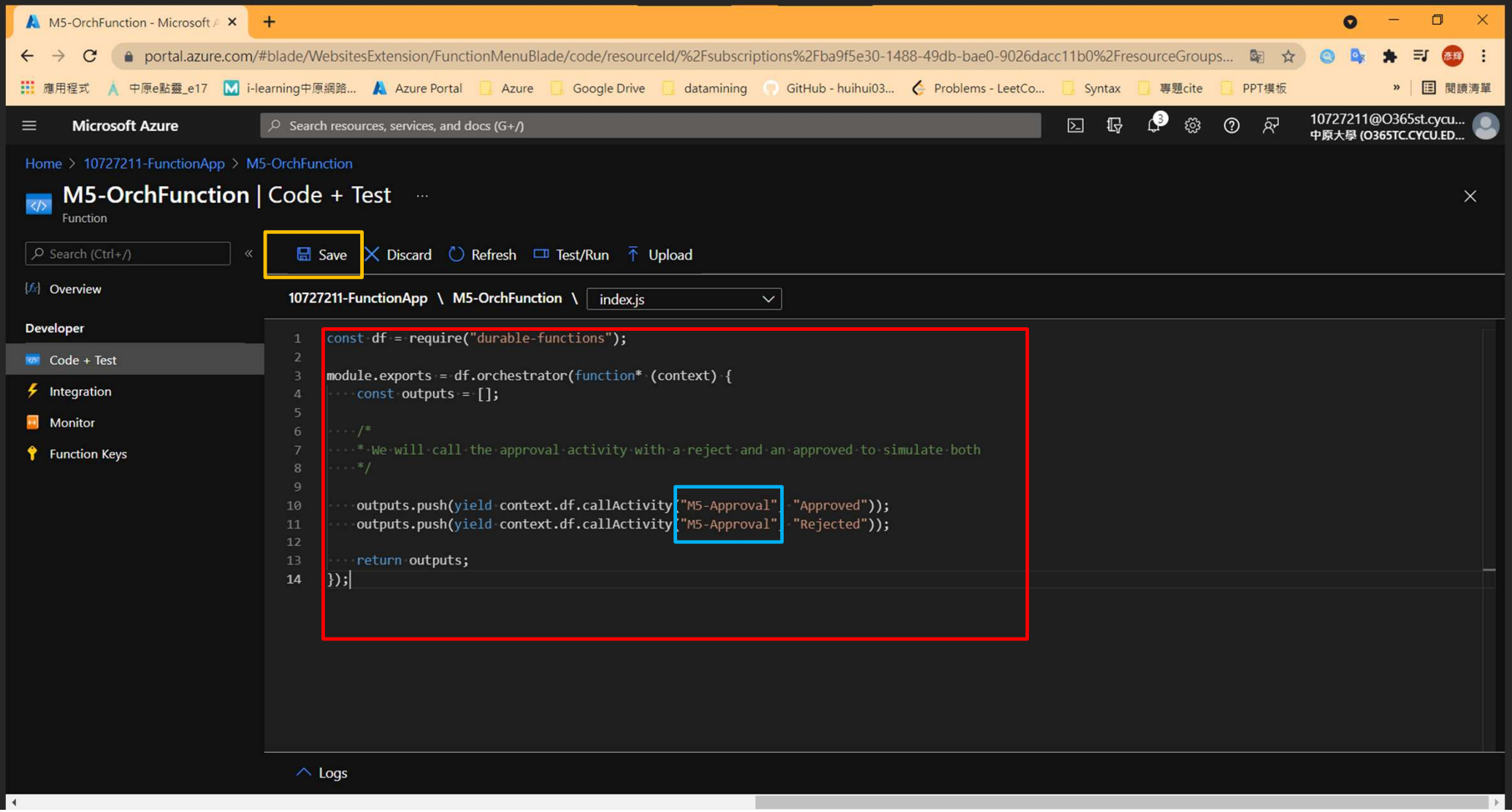
Create Durable Functions Http start



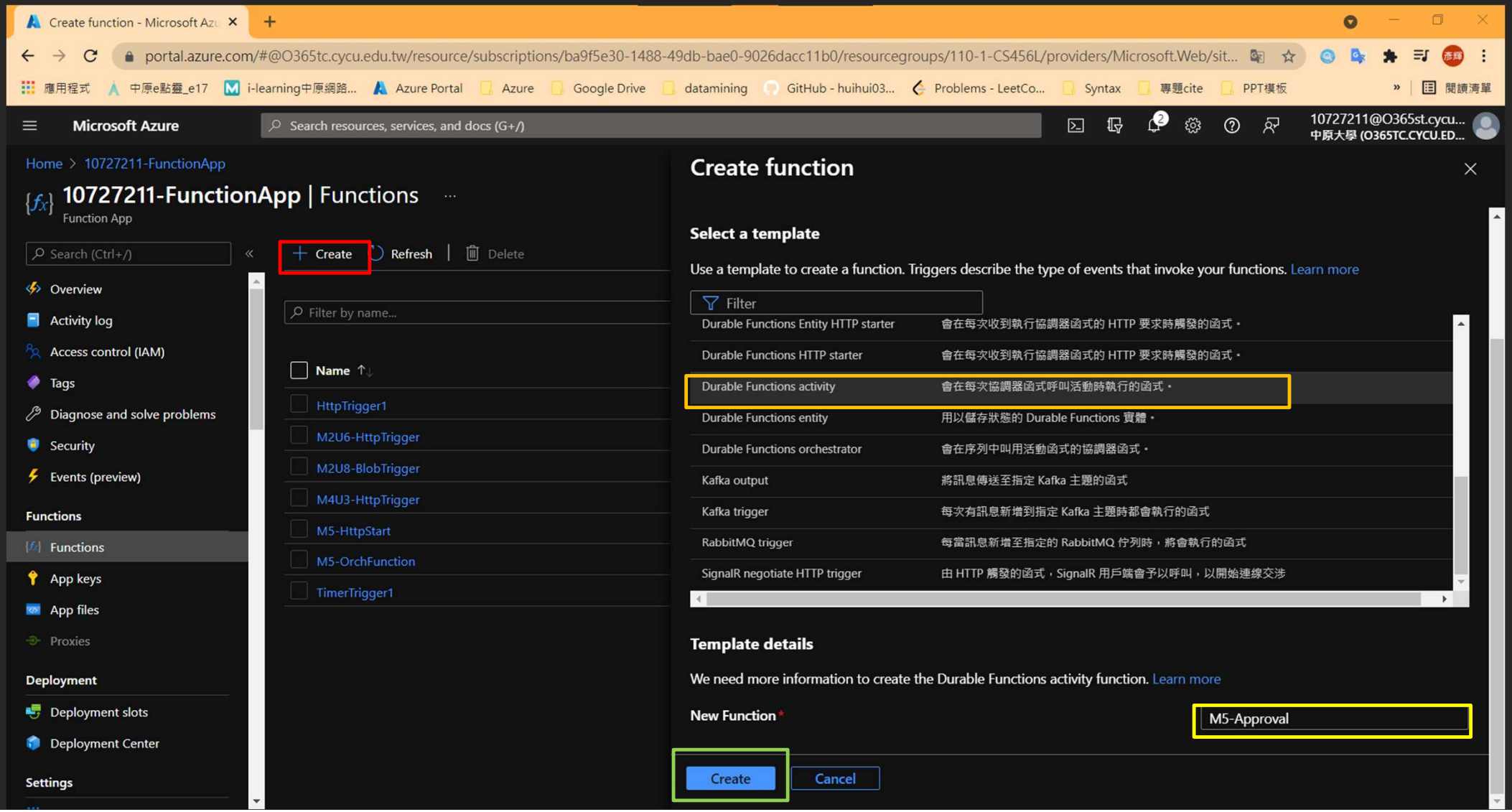
Create the orchestrator function - 1



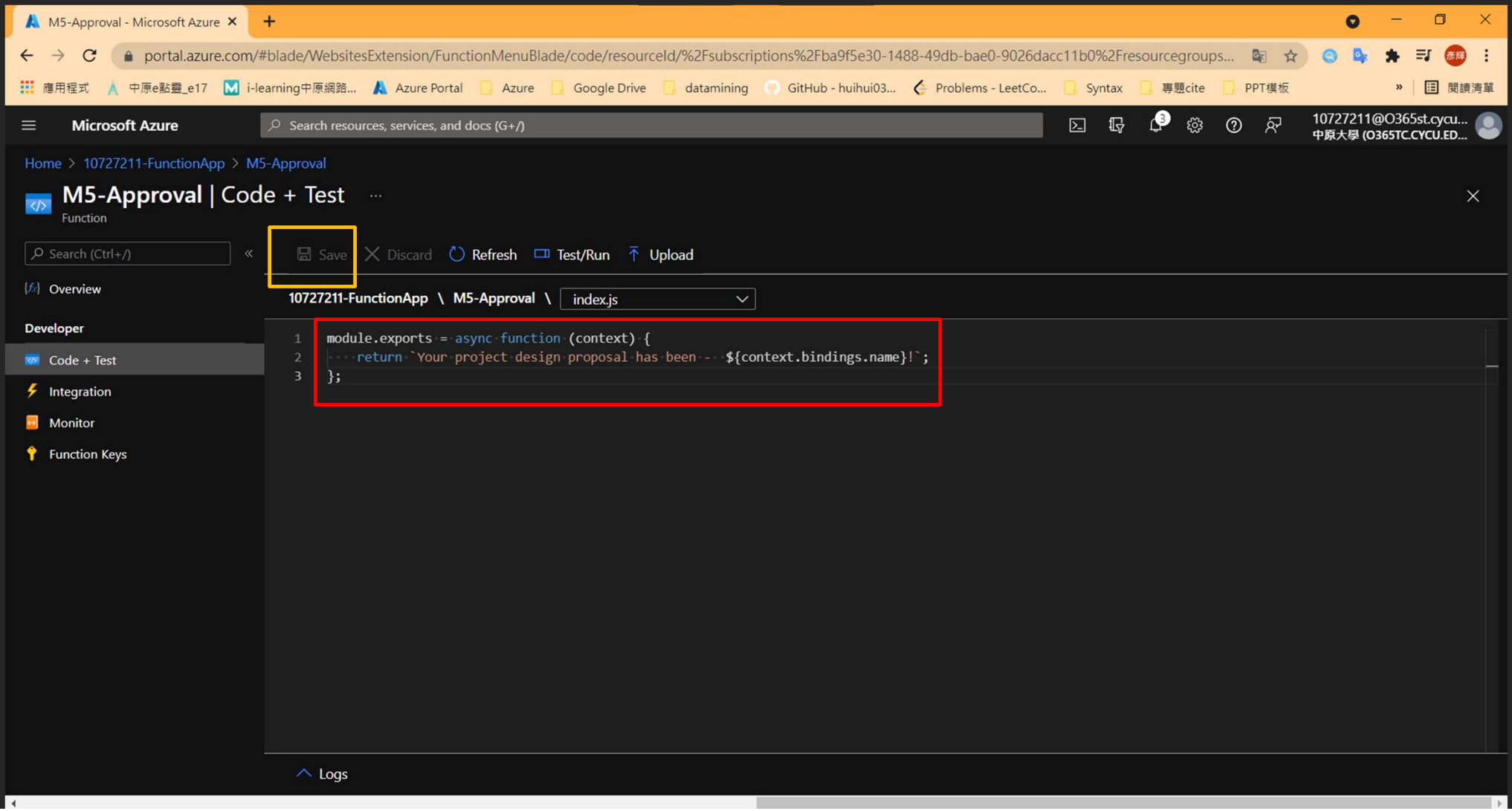
Create the orchestrator function - 2



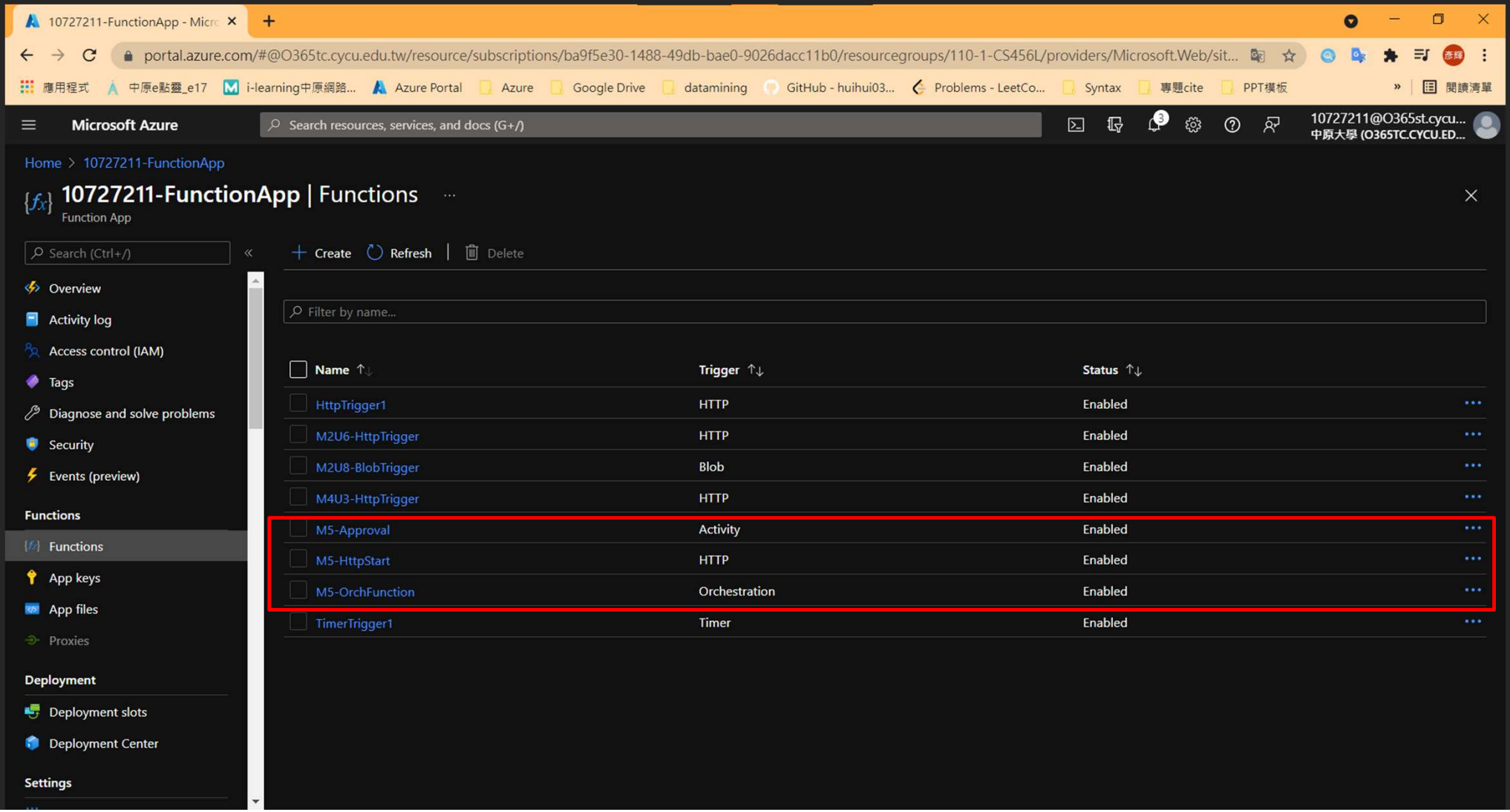
Create the activity function - 1



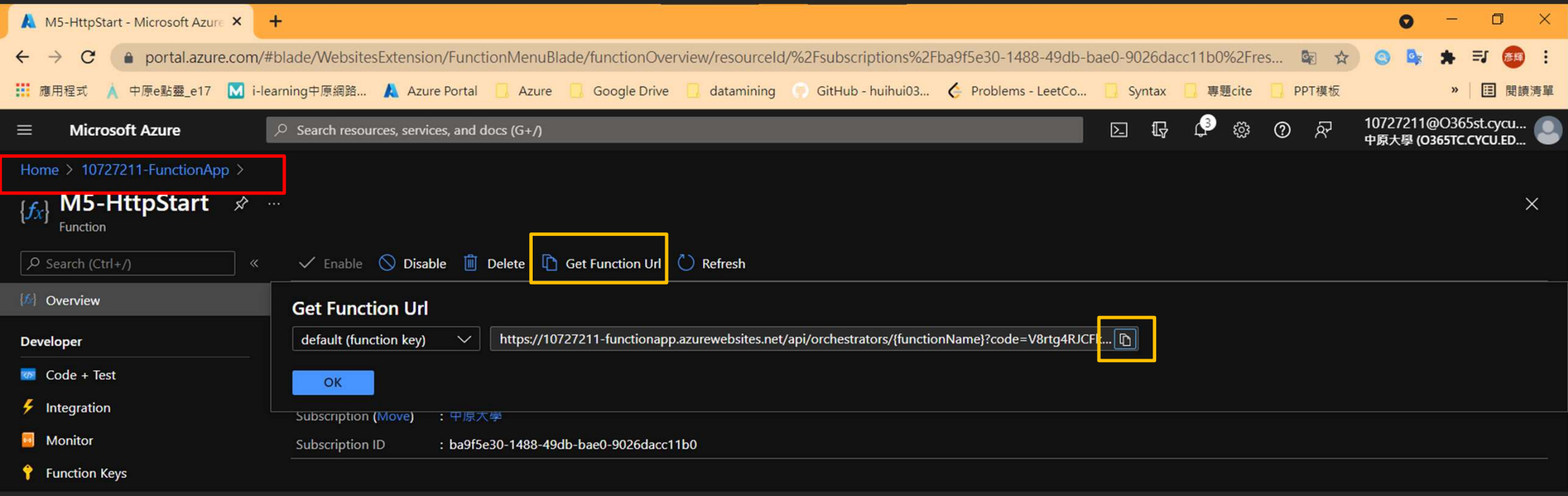
Create the activity function - 2



Check Point : HttpStart 、OrchFunction 、Approval



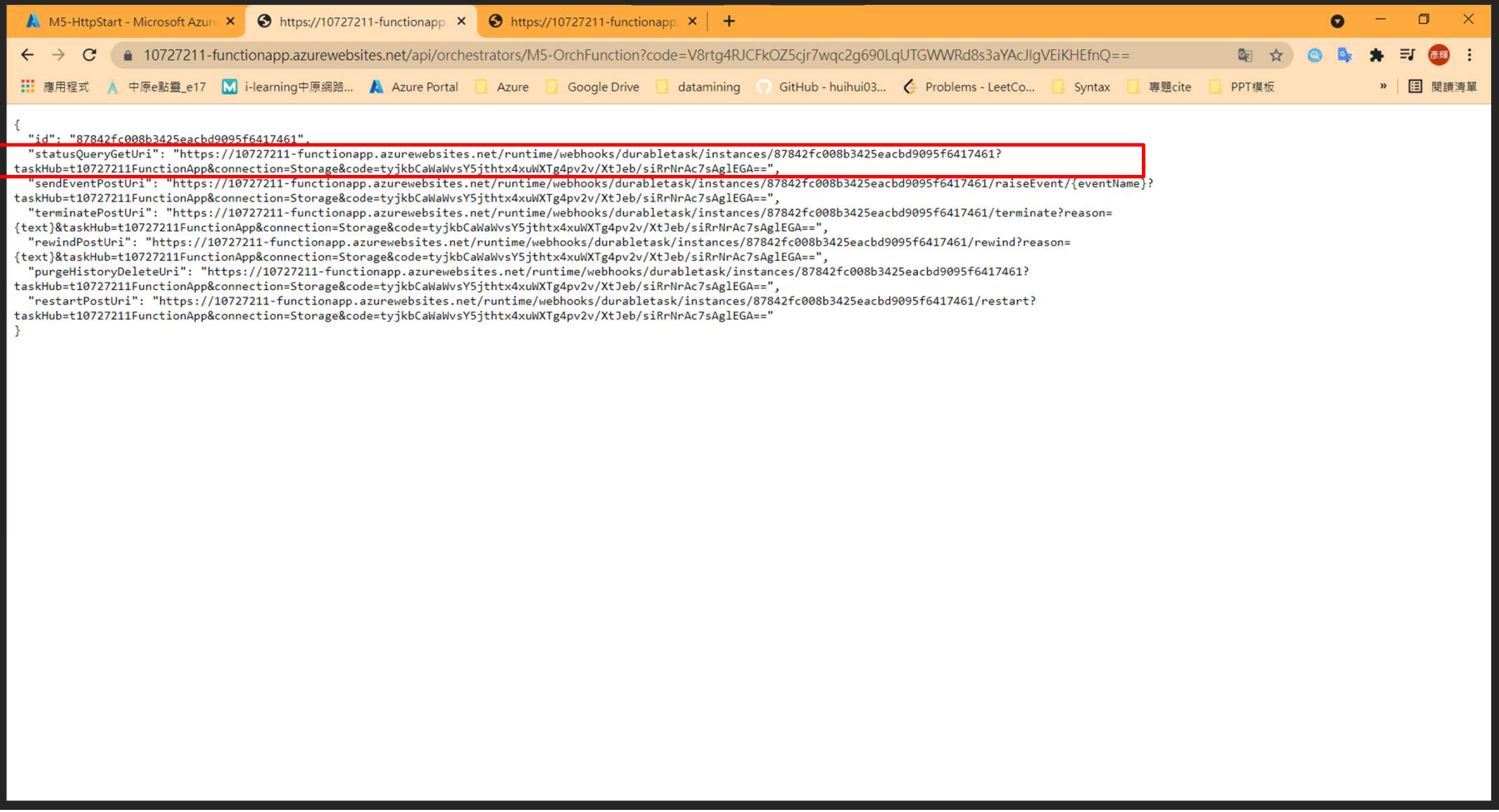
Verify that the durable functions workflow starts - 1



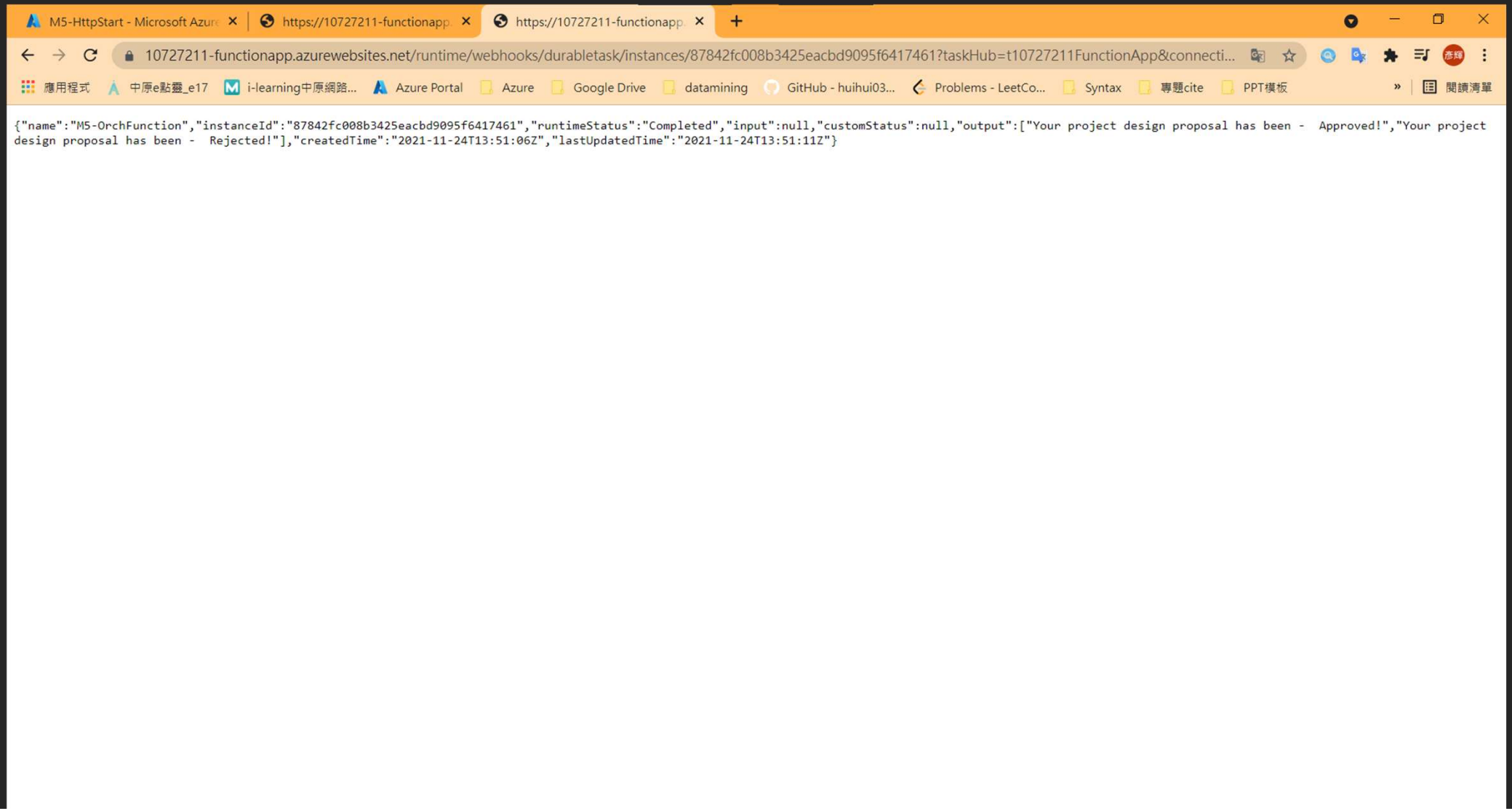
https://10727211-functionapp.azurewebsites.net/api/orchestrators/{functionName}?code=V8rtg4RJCFkOZ5cjr7wqc2g690LqUTGWWRd8s3aYAcJlgVEiKHEfnQ==

https://10727211-functionapp.azurewebsites.net/api/orchestrators/M5-OrchFunction?code=V8rtg4RJCFkOZ5cjr7wqc2g690LqUTGWWRd8s3aYAcJlgVEiKHEfnQ==

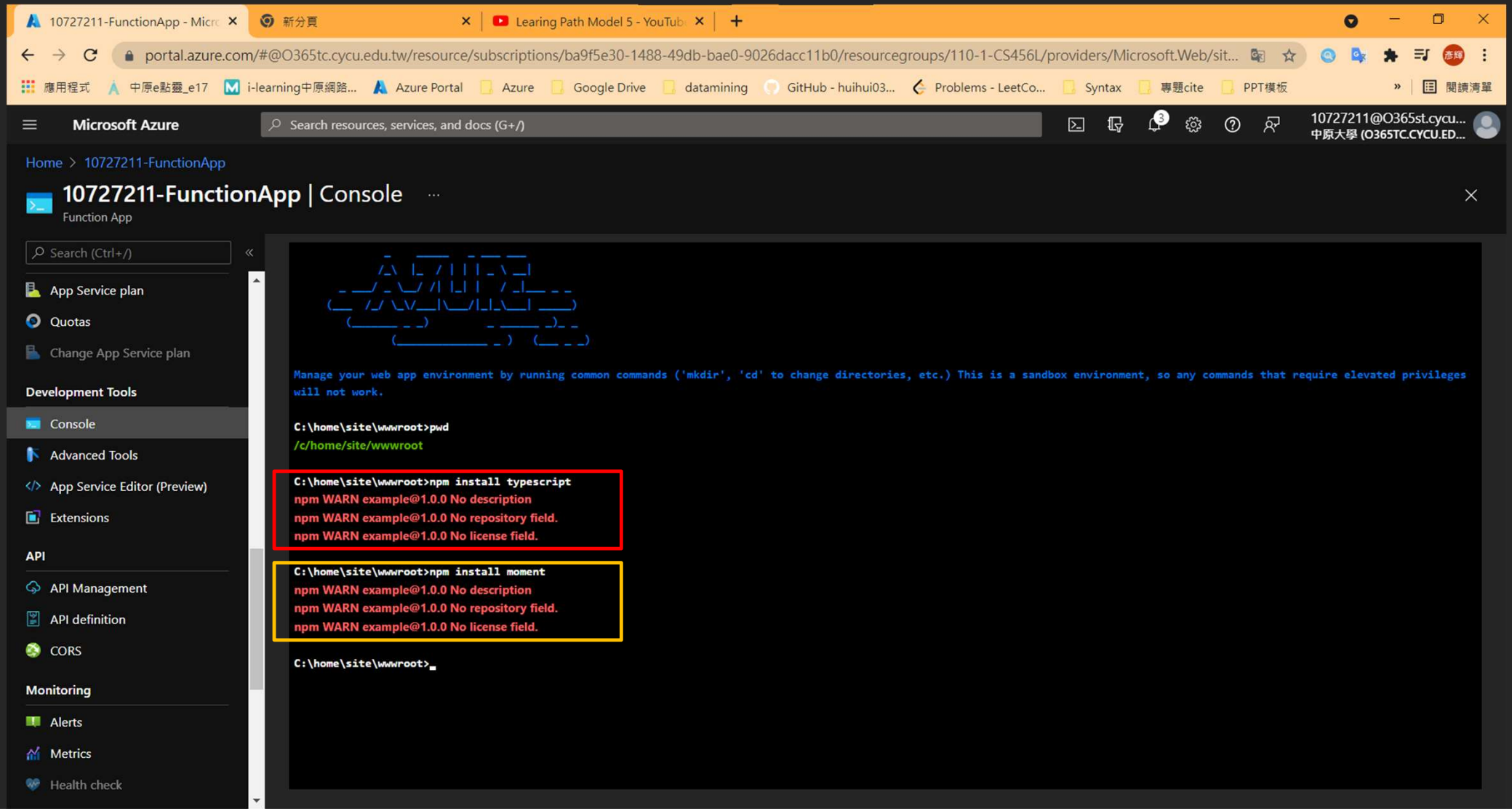
Verify that the durable functions workflow starts - 2



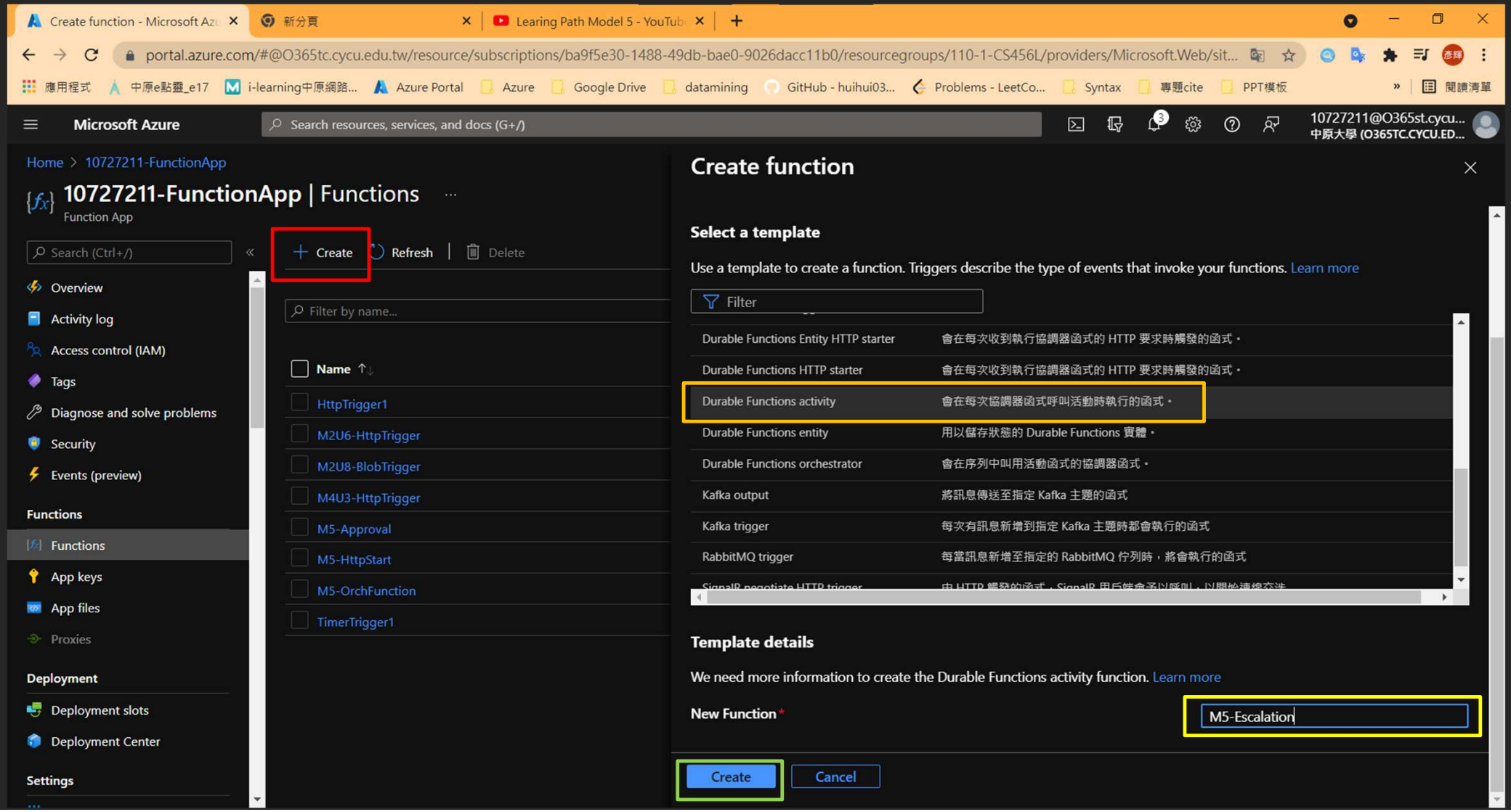
Verify that the durable functions workflow starts - 3



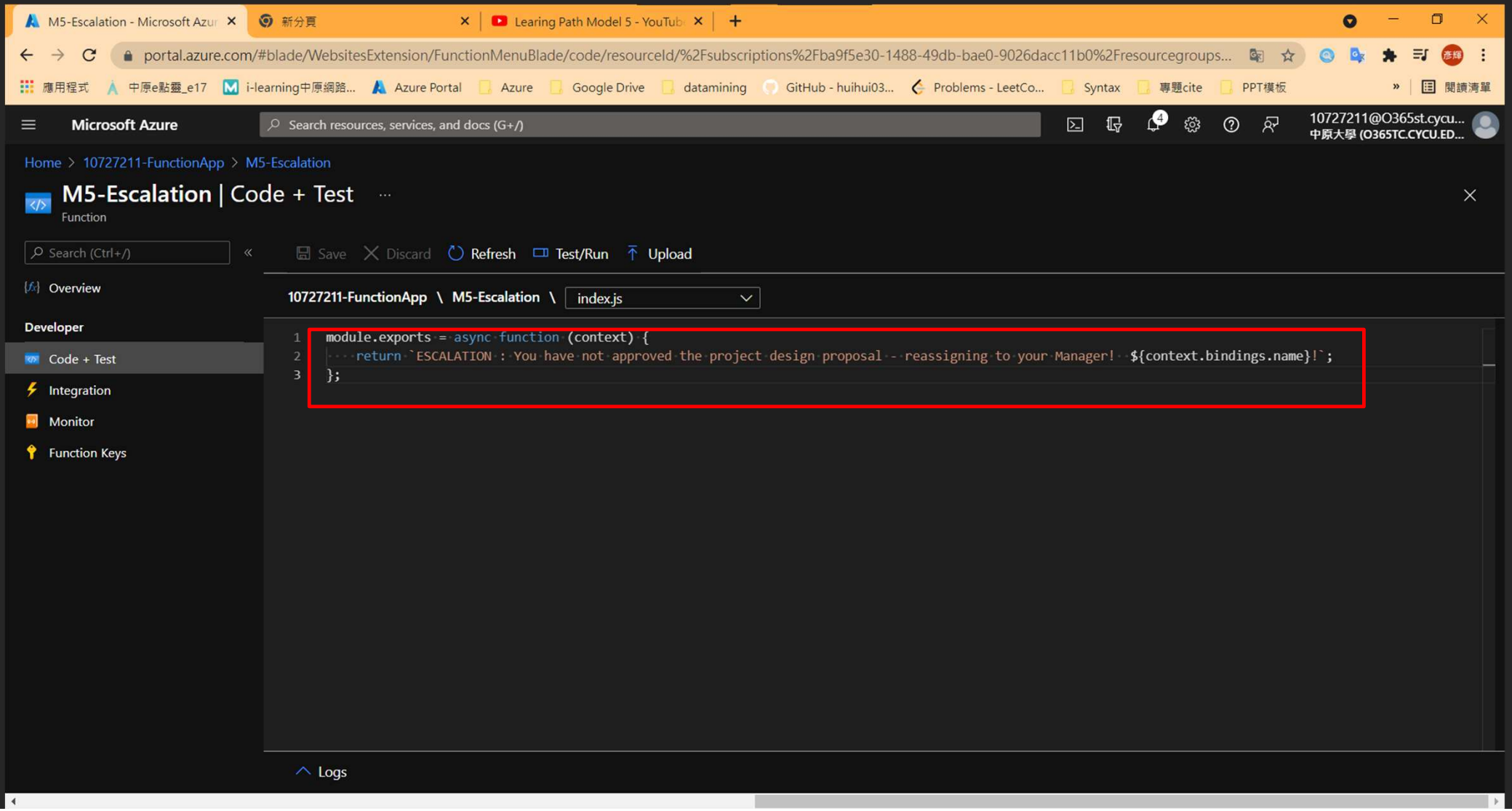
Add moment npm package to your function app



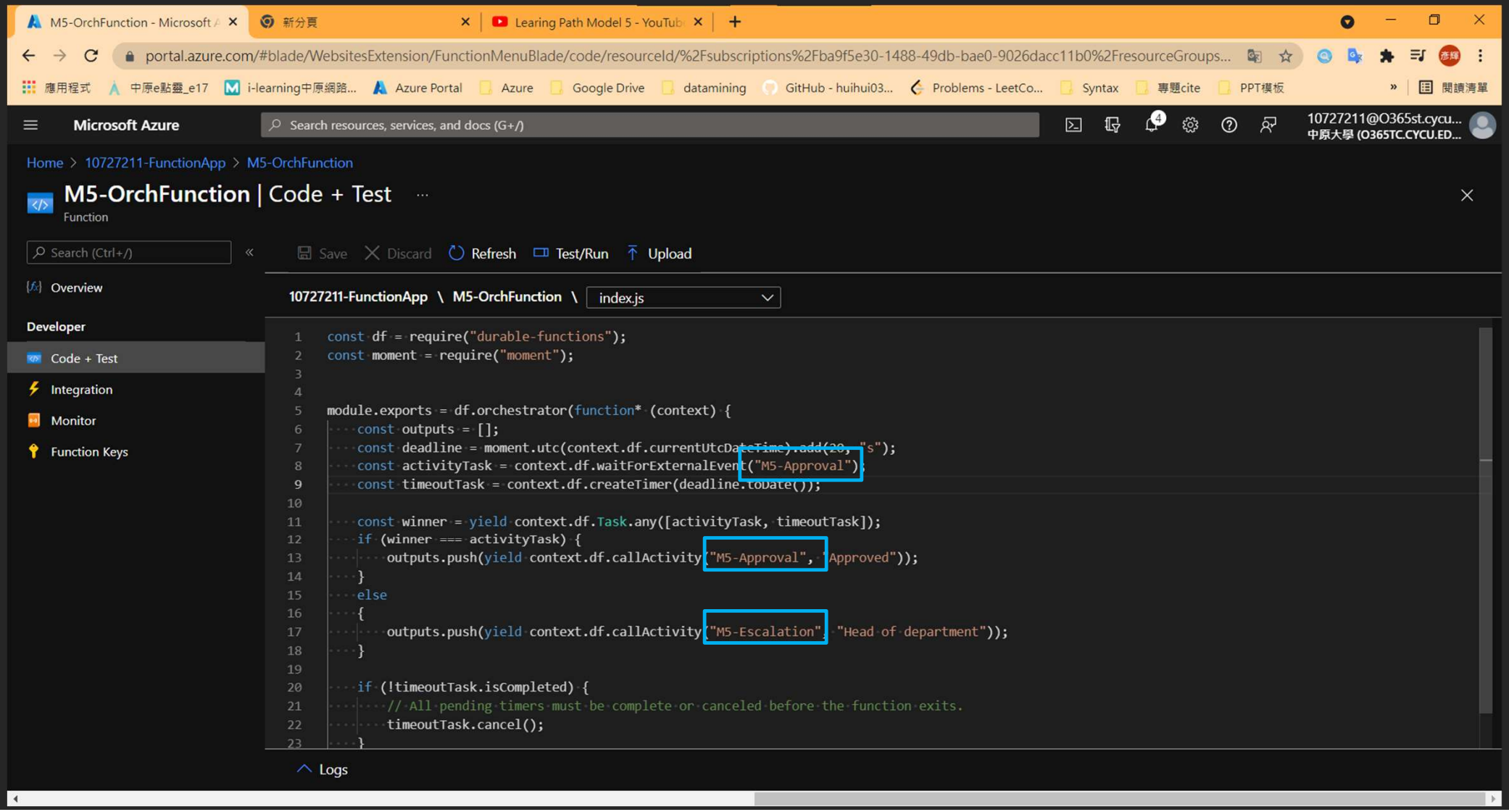
Add an escalation activity to your function app - 1



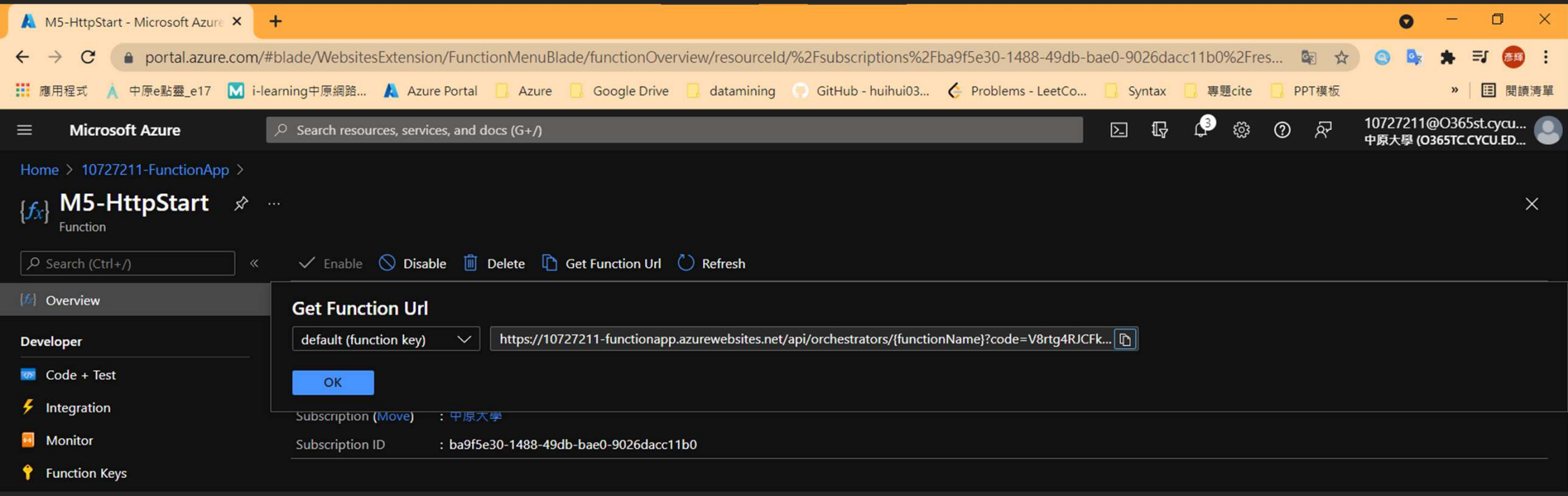
Add an escalation activity to your function app - 2



Update the orchestration function to use the escalation function



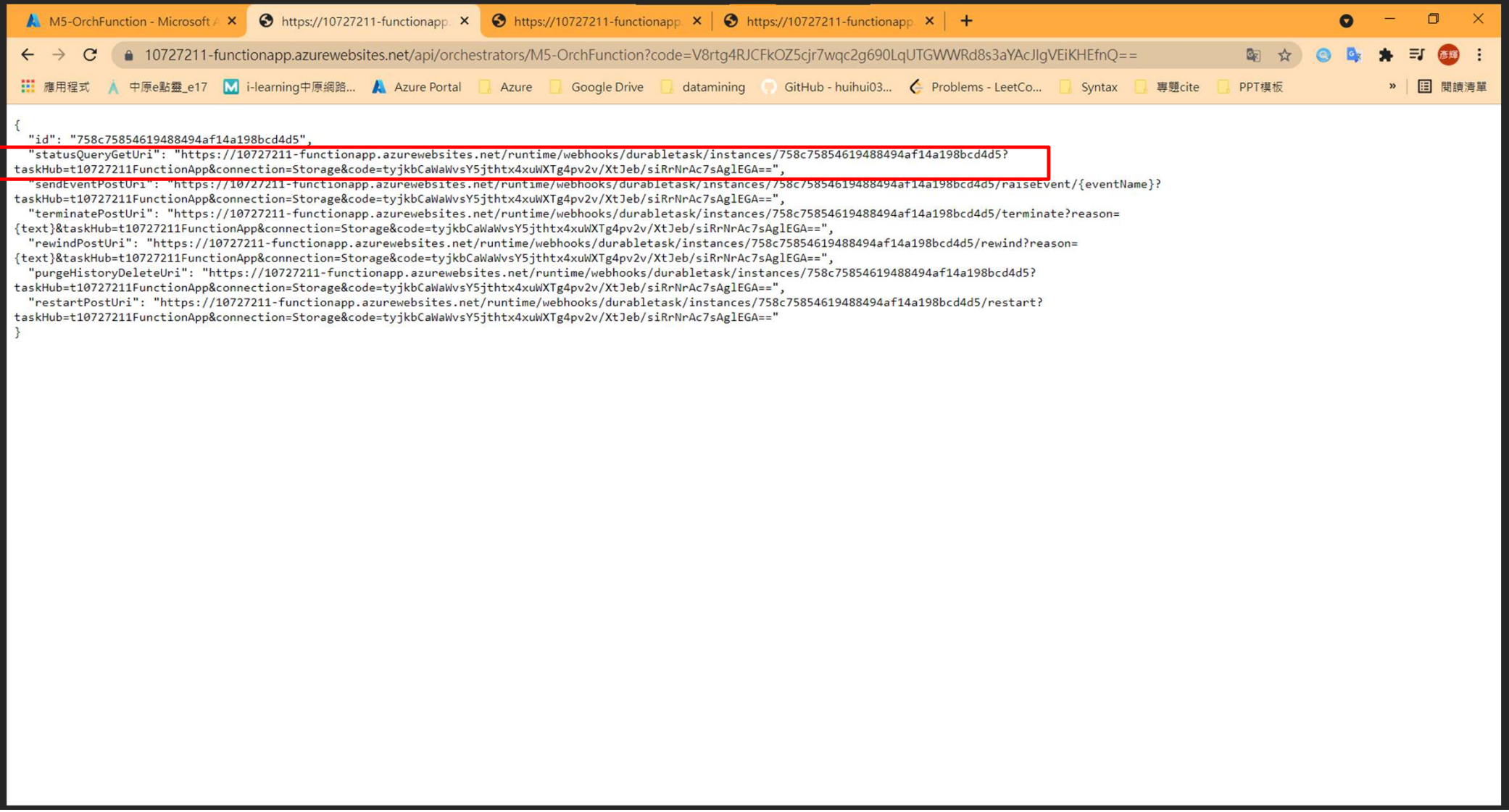
Verify that the Durable Functions workflow starts - 1



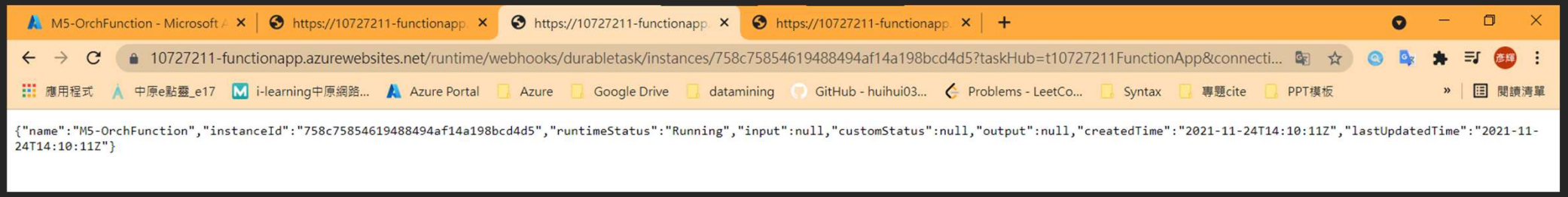
https://10727211-functionapp.azurewebsites.net/api/orchestrators/{functionName}?code=V8rtg4RJCFkOZ5cjr7wqc2g690LqUTGWWRd8s3aYAcJlgVEiKHEfnQ==

https://10727211-functionapp.azurewebsites.net/api/orchestrators/M5-OrchFunction?code=V8rtg4RJCFkOZ5cjr7wqc2g690LqUTGWWRd8s3aYAcJlgVEiKHEfnQ==

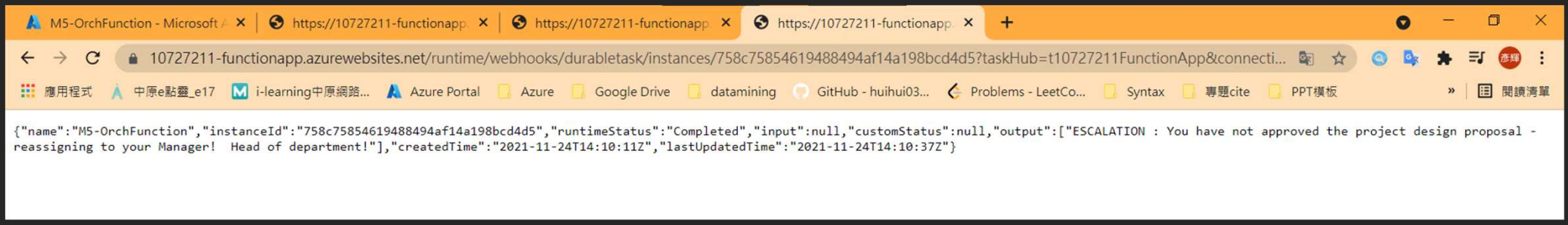
Verify that the Durable Functions workflow starts - 2



Verify that the Durable Functions workflow starts - 3



20s



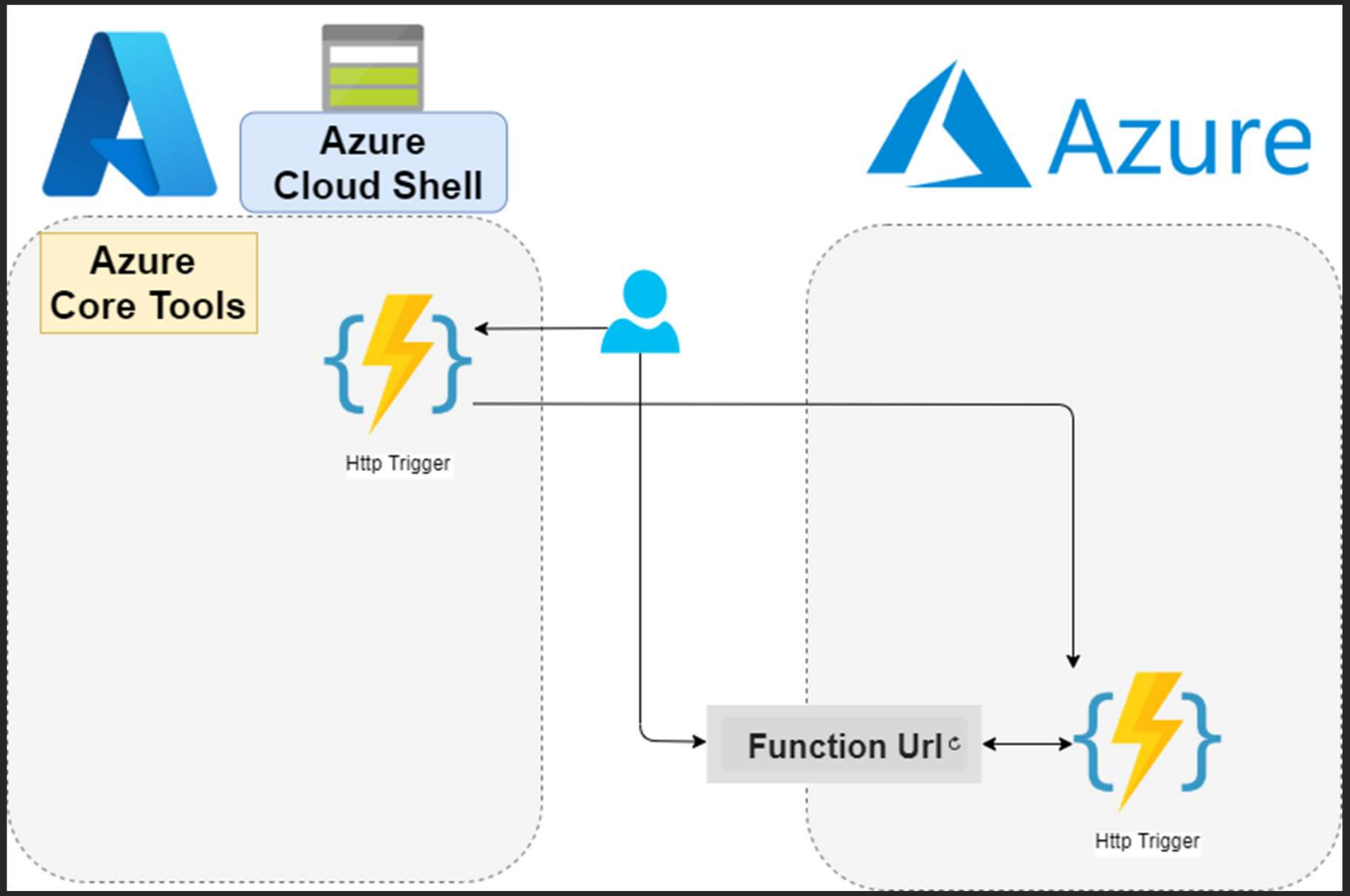
06 Develop, test, and publish Azure Functions by using Azure Functions Core Tools

Starter

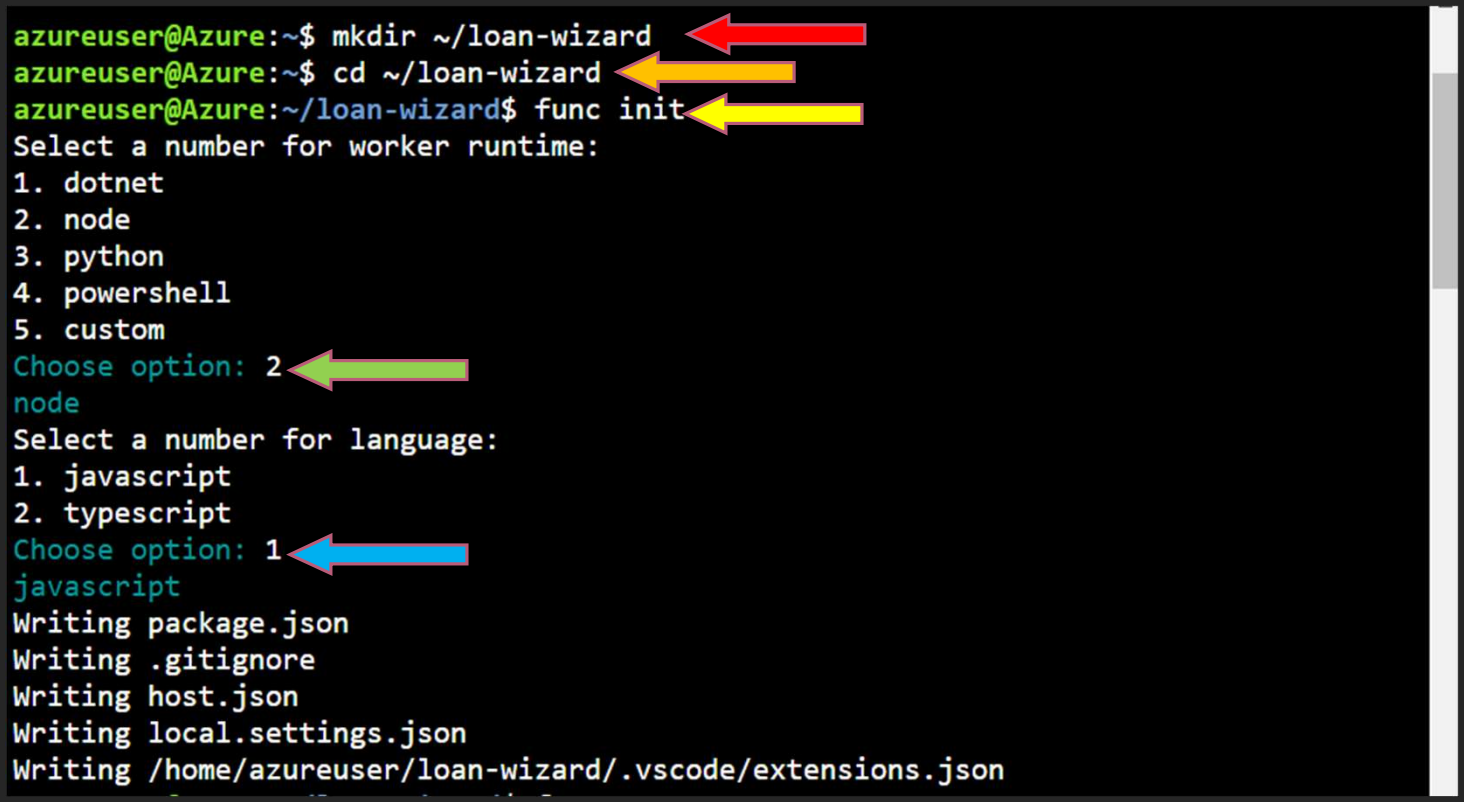
Warning : Azure Cloud Shell 無法實現功能 ， 請開啟Sandbox

網址：https://docs.microsoft.com/en-us/learn/modules/develop-test-deploy-azure-functions-with-core-tools/3-exercise-create-function-core-tools

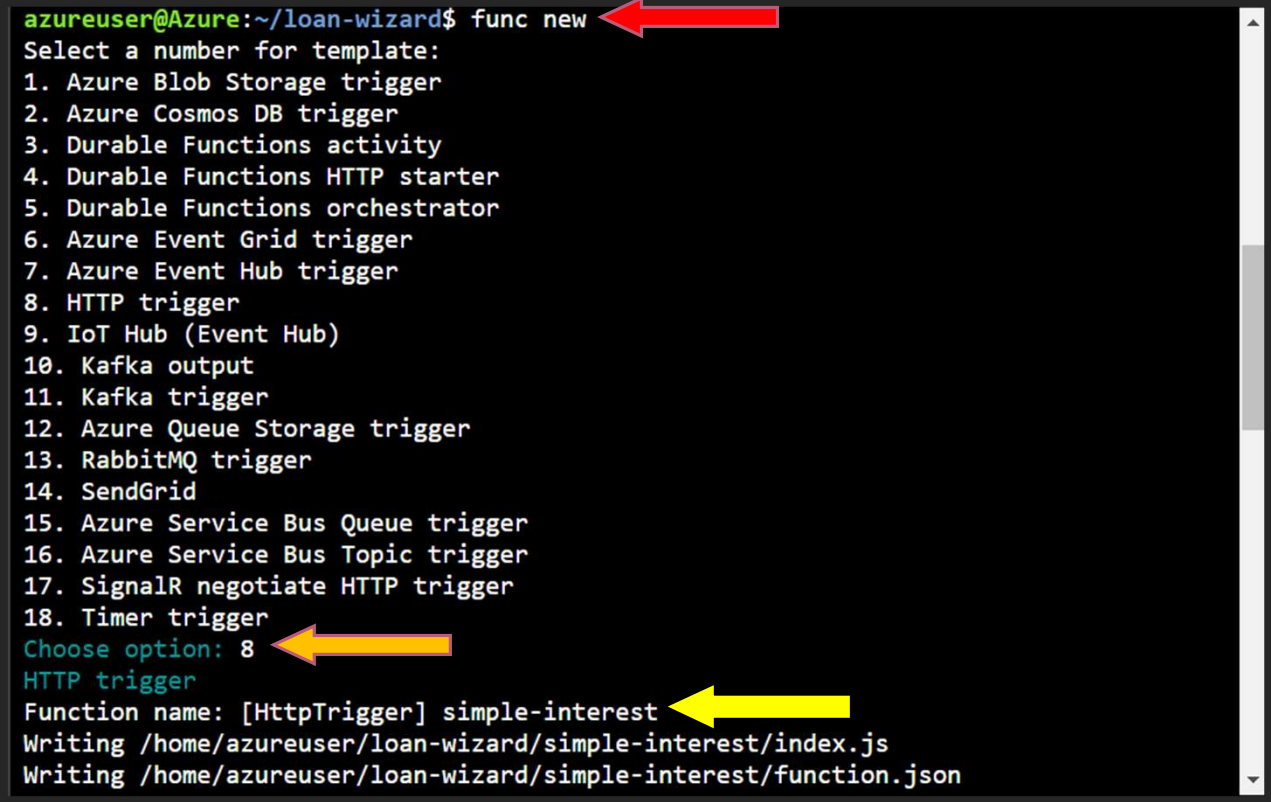
Abstract


Azure
Cloud Shell
Azure
Azure
Core Tools
Http Trigger
Function Url
Http Trigger

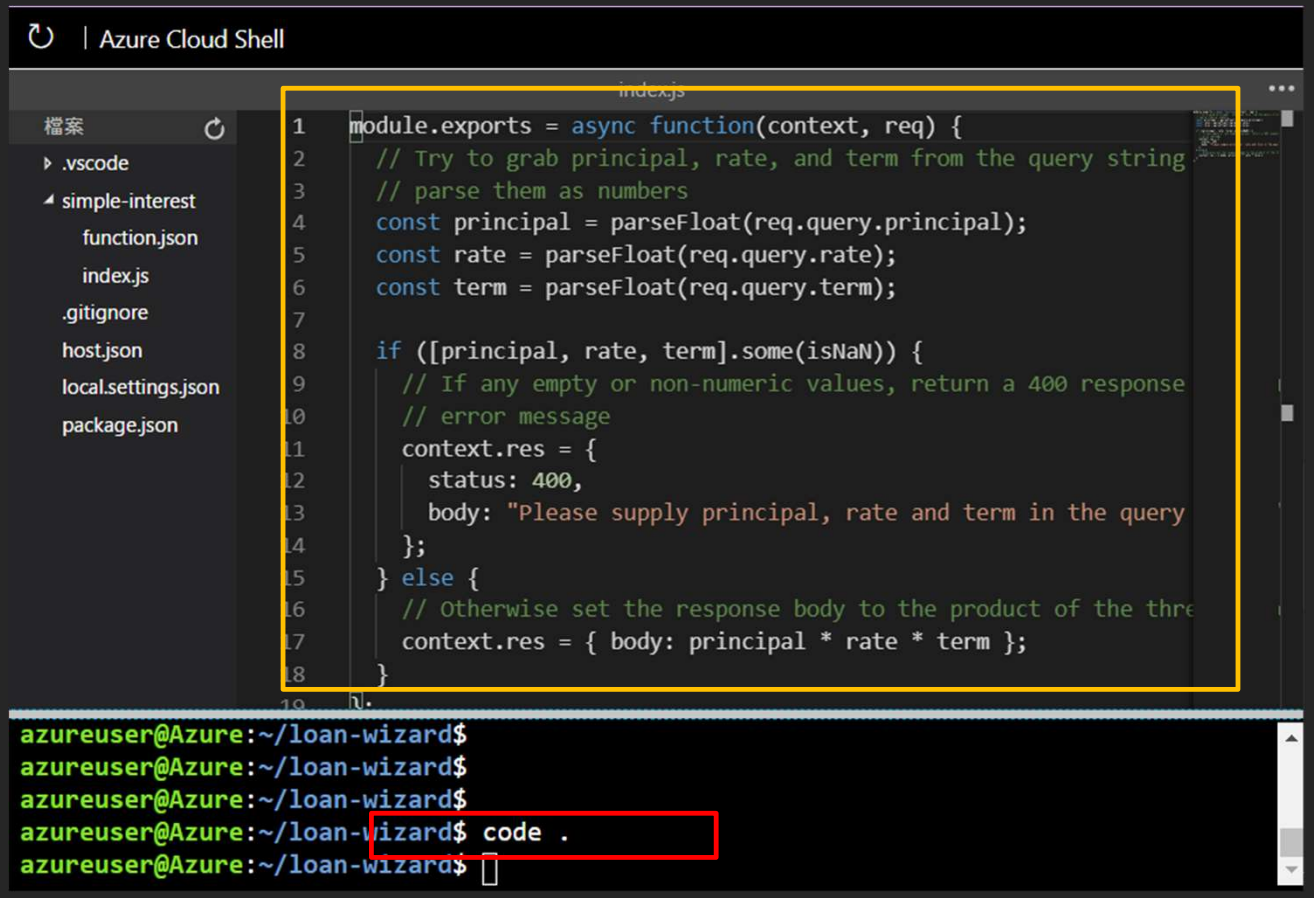
Create a local Azure Functions project



Create an HTTP-triggered function

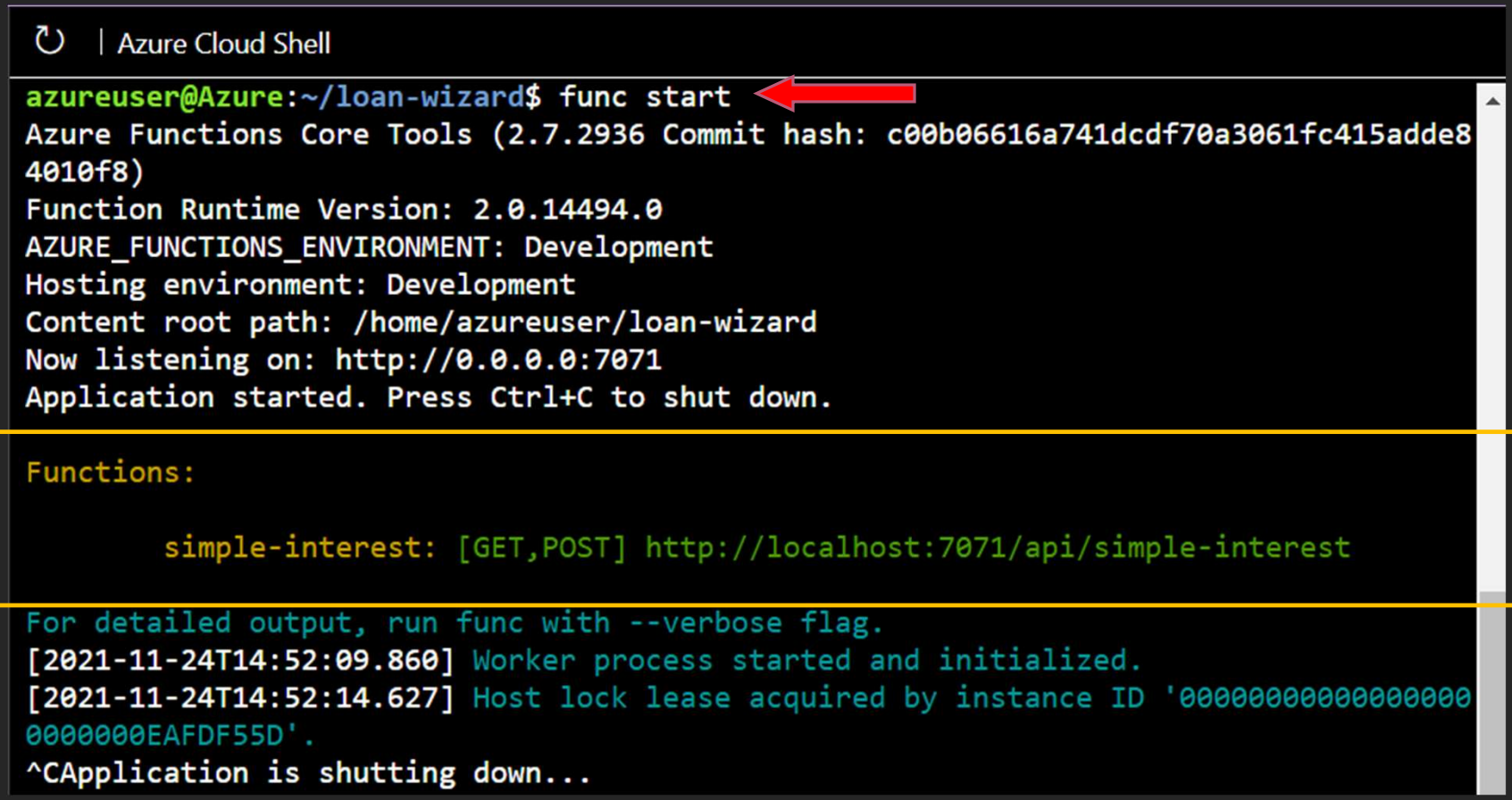


Replace index.js



Ctrl+S
Ctrl+Q

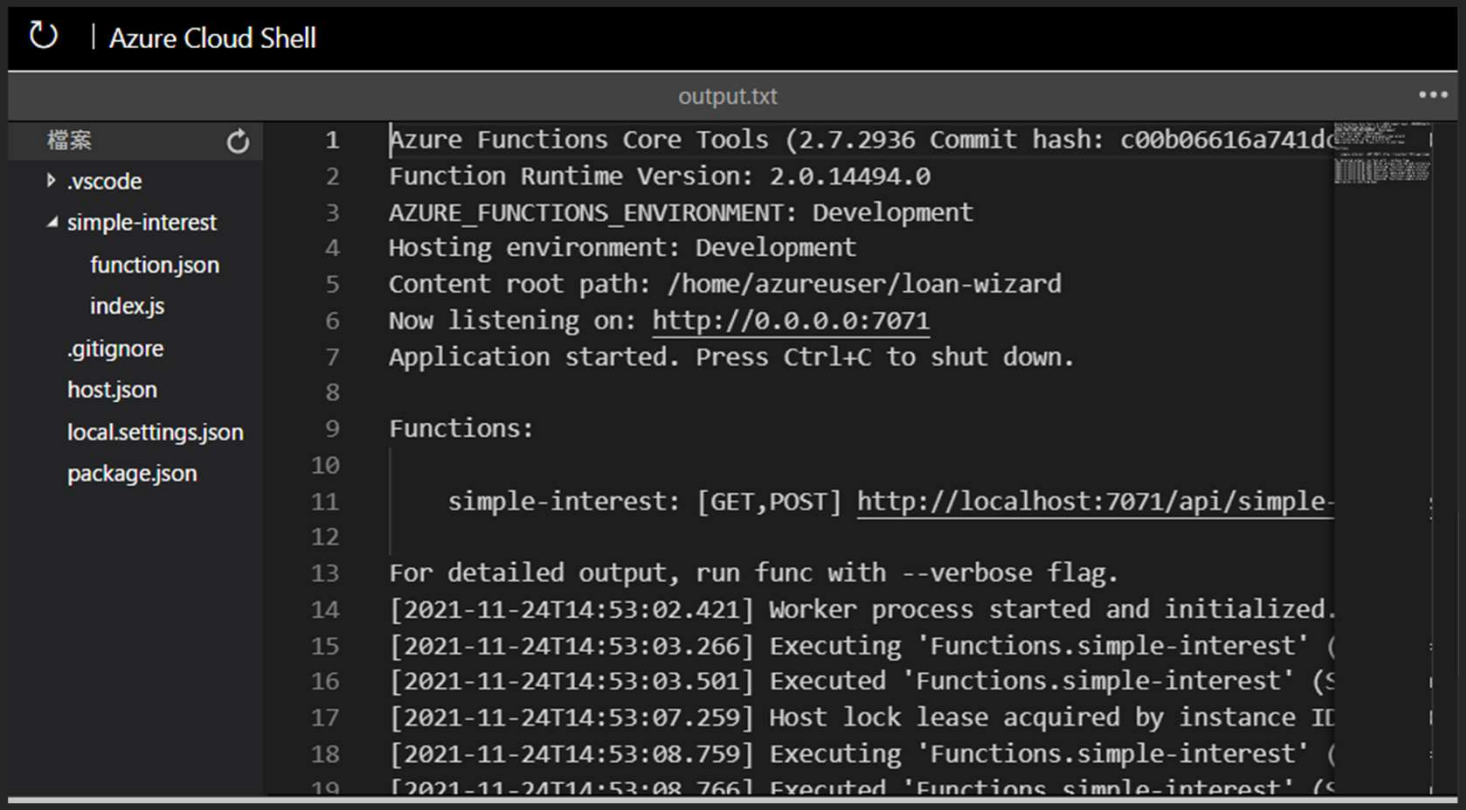
Run the function locally - 1



Run the function locally - 2

```
azureuser@Azure:~/loan-wizard$ func start &> ~/output.txt &
[1] 261
azureuser@Azure:~/loan-wizard$ curl "http://localhost:7071/api/simple-interest" -w "
\n"
Please supply principal, rate and term in the query string
azureuser@Azure:~/loan-wizard$ curl "http://localhost:7071/api/simple-interest?princ
ipal=5000&rate=.035&term=36" -w "\n"
6300
azureuser@Azure:~/loan-wizard$ pkill func
azureuser@Azure:~/loan-wizard$
[1]+  Done                    func start &> ~/output.txt
azureuser@Azure:~/loan-wizard$ code ~/output.txt
```

Output.txt

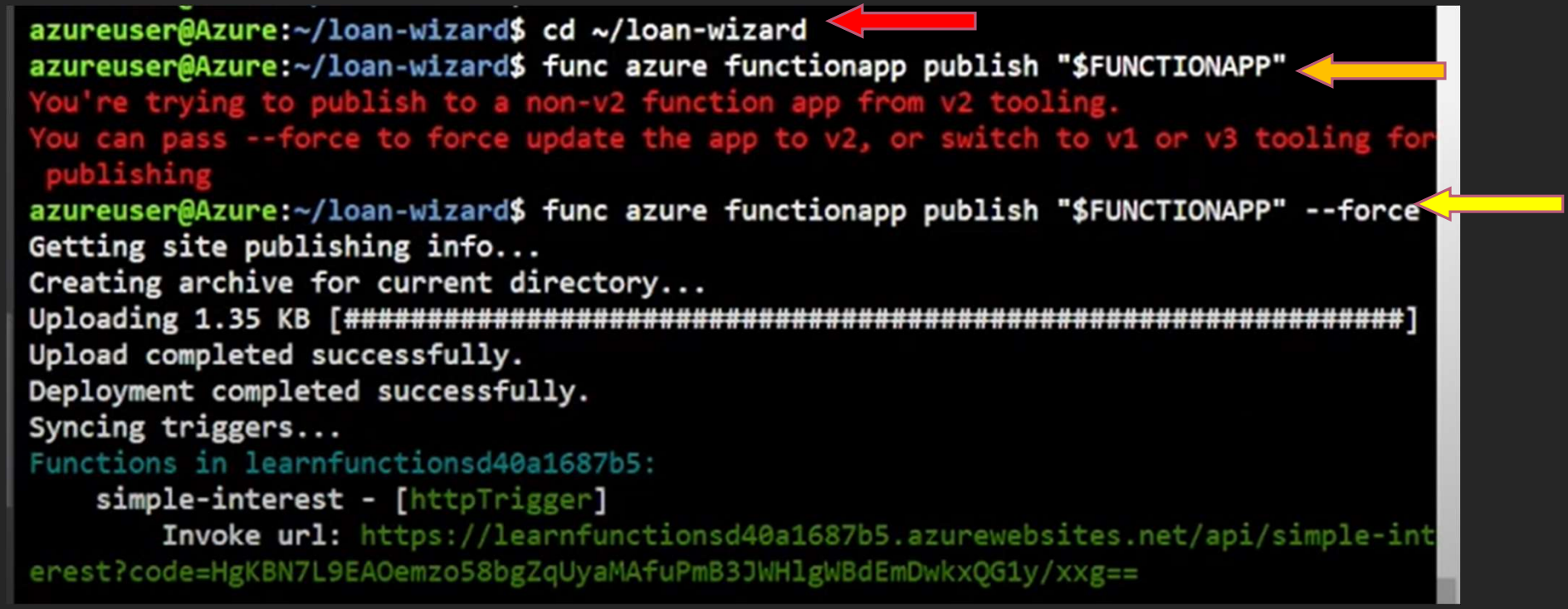

Azure Cloud Shell
output.txt
檔案
.vscode
simple-interest
function.json
index.js
.gitignore
host.json
local.settings.json
package.json
1 Azure Functions Core Tools (2.7.2936 Commit hash: c00b06616a741d
2 Function Runtime Version: 2.0.14494.0
3 AZURE_FUNCTIONS_ENVIRONMENT: Development
4 Hosting environment: Development
5 Content root path: /home/azureuser/loan-wizard
6 Now listening on: http://0.0.0.0:7071
7 Application started. Press Ctrl+C to shut down.
8
9 Functions:
10
11 simple-interest: [GET,POST] http://localhost:7071/api/simple-
12
13 For detailed output, run func with --verbose flag.
14 [2021-11-24T14:53:02.421] Worker process started and initialized.
15 [2021-11-24T14:53:03.266] Executing 'Functions.simple-interest' (
16 [2021-11-24T14:53:03.501] Executed 'Functions.simple-interest' (
17 [2021-11-24T14:53:07.259] Host lock lease acquired by instance ID
18 [2021-11-24T14:53:08.759] Executing 'Functions.simple-interest' (
19 [2021-11-24T14:53:08.766] Executed 'Functions.simple-interest' (

Create a function app

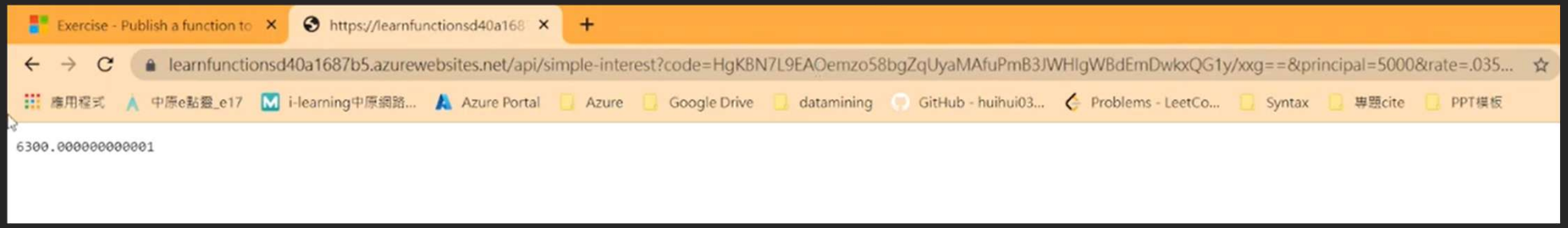
```
azureuser@Azure:~/loan-wizard$ RESOURCEGROUP="learn-0f6b9075-14e1-4f58-9cb9-cd8a0f437
c8a"
azureuser@Azure:~/loan-wizard$ STORAGEACCT=learnstorage$(openssl rand -hex 5)
azureuser@Azure:~/loan-wizard$ FUNCTIONAPP=learnfunctions$(openssl rand -hex 5)
azureuser@Azure:~/loan-wizard$
azureuser@Azure:~/loan-wizard$ az storage account create \
>   --resource-group "$RESOURCEGROUP" \
>   --name "$STORAGEACCT" \
>   --kind StorageV2 \
>   --location centralus
```

```
azureuser@Azure:~/loan-wizard$ az functionapp create \
>   --resource-group "$RESOURCEGROUP" \
>   --name "$FUNCTIONAPP" \
>   --storage-account "$STORAGEACCT" \
>   --runtime node \
>   --consumption-plan-location centralus \
>   --functions-version 3
```

Publish to Azure

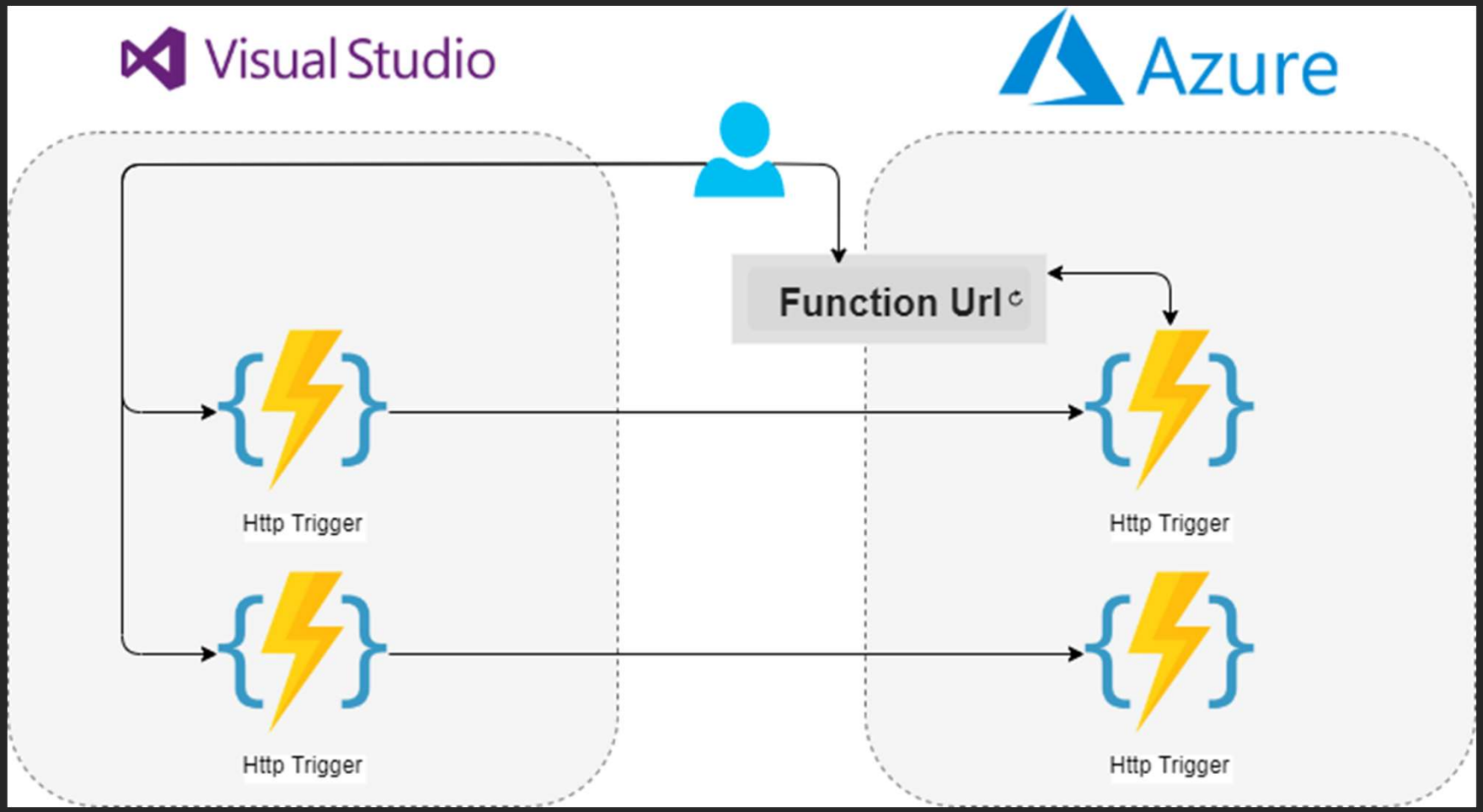


Run the function



07 Develop, test, and deploy an Azure Function with Visual Studio

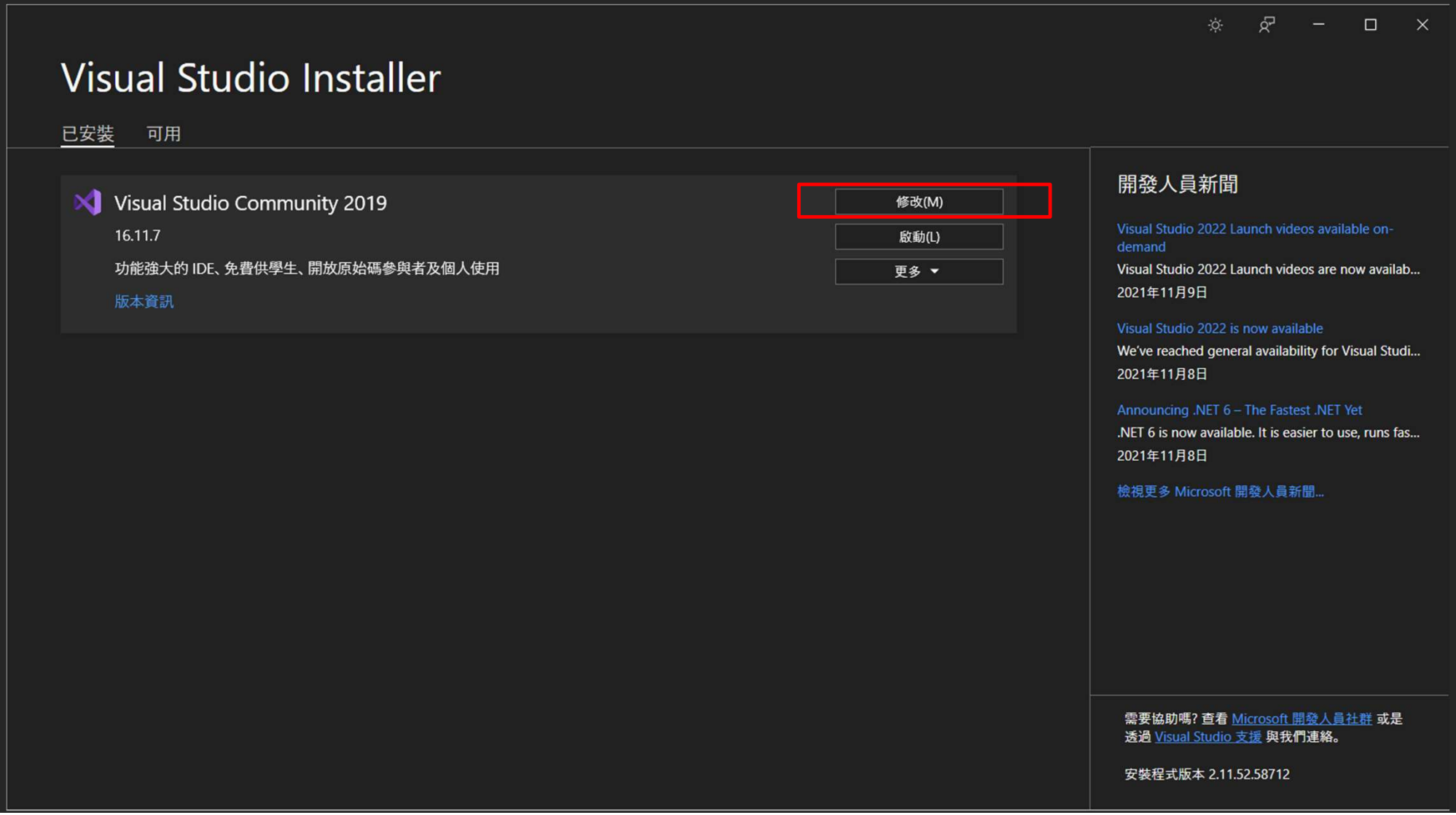
Abstract


Visual Studio
Azure
Function Url
Http Trigger
Http Trigger
Http Trigger
Http Trigger

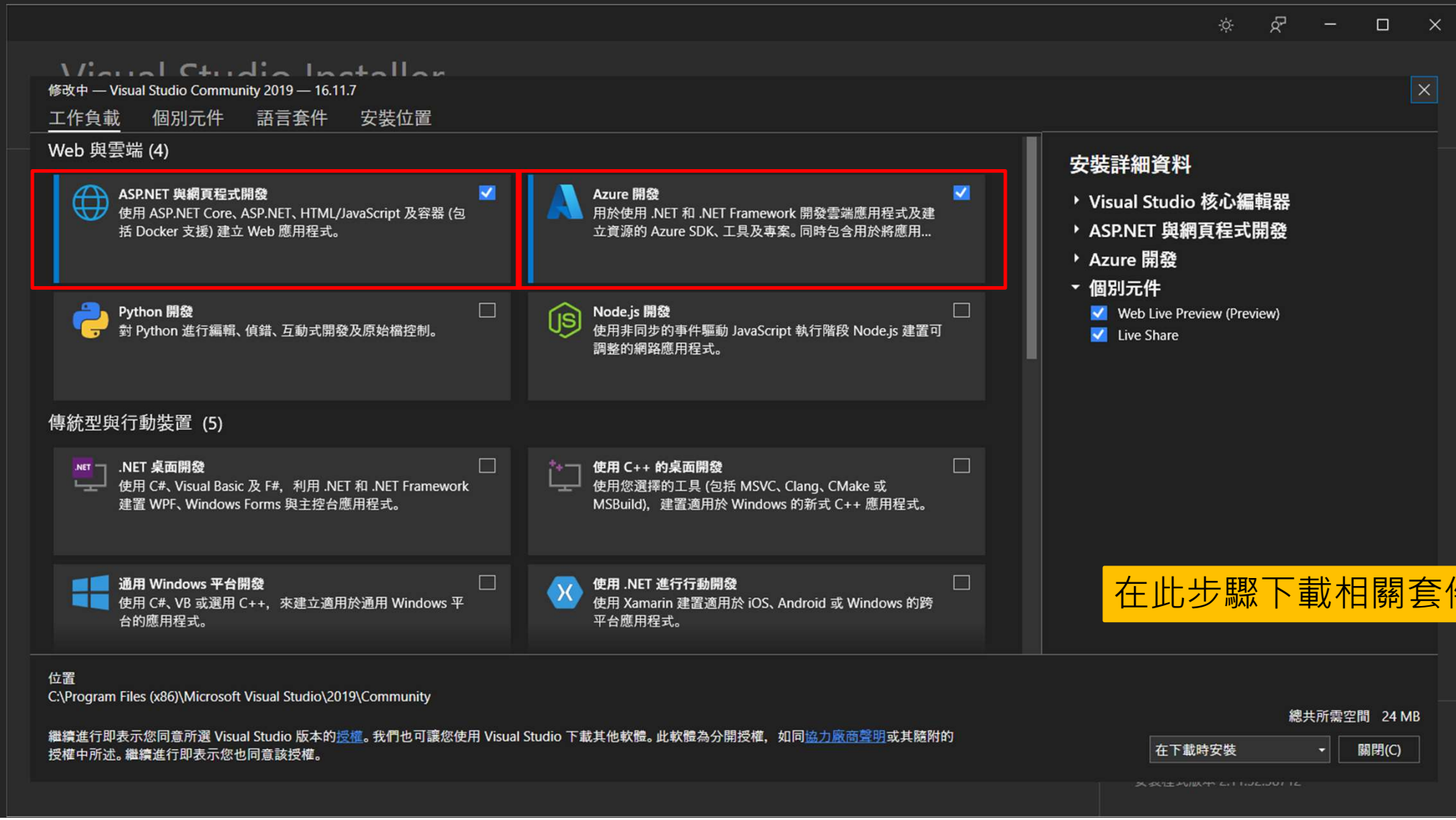
Starter - Requirement

Install Visual Studio & package

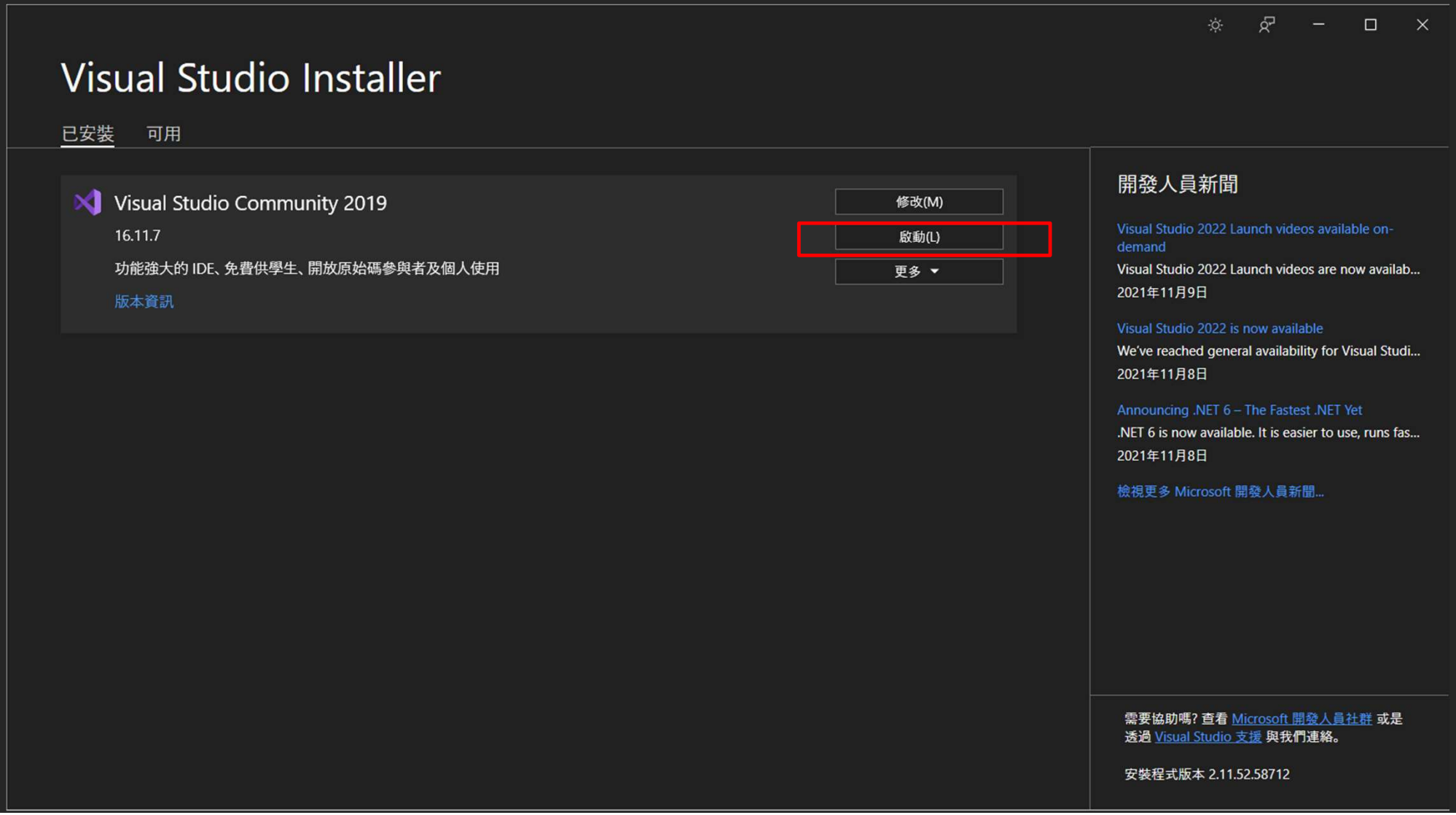
Open Visual Studio Installer - 1



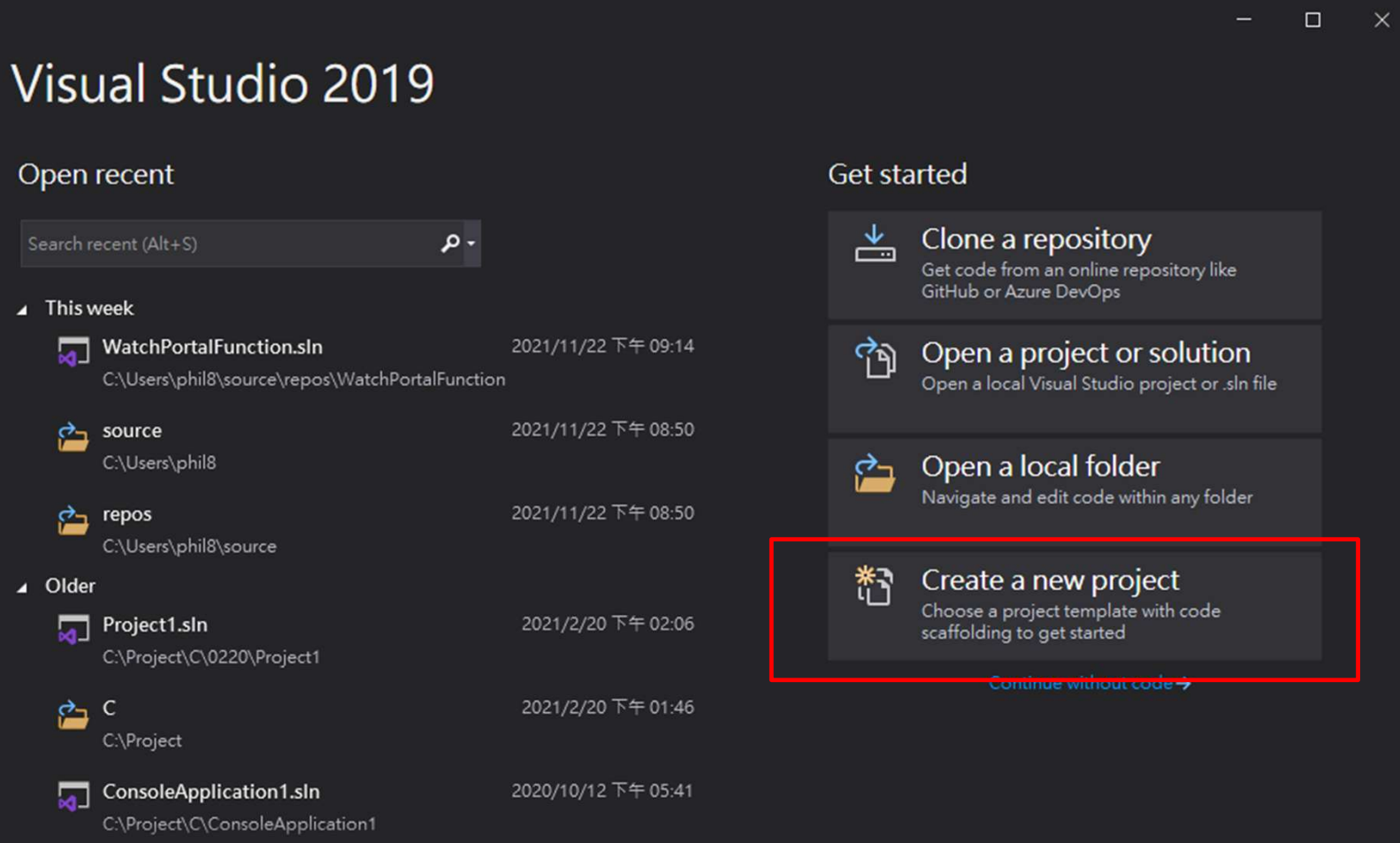
Open Visual Studio Installer - 2



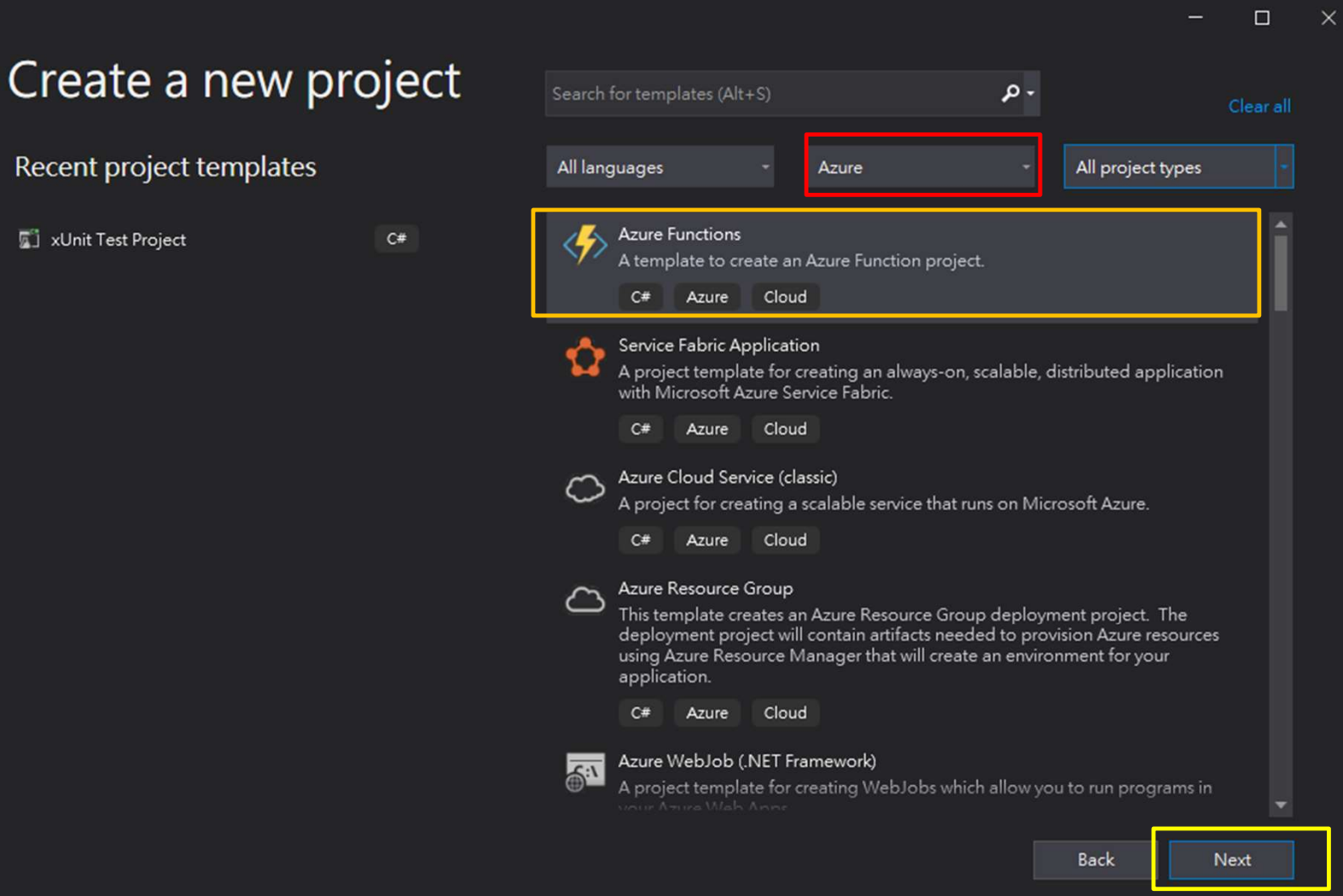
Create an Azure Function App - 1



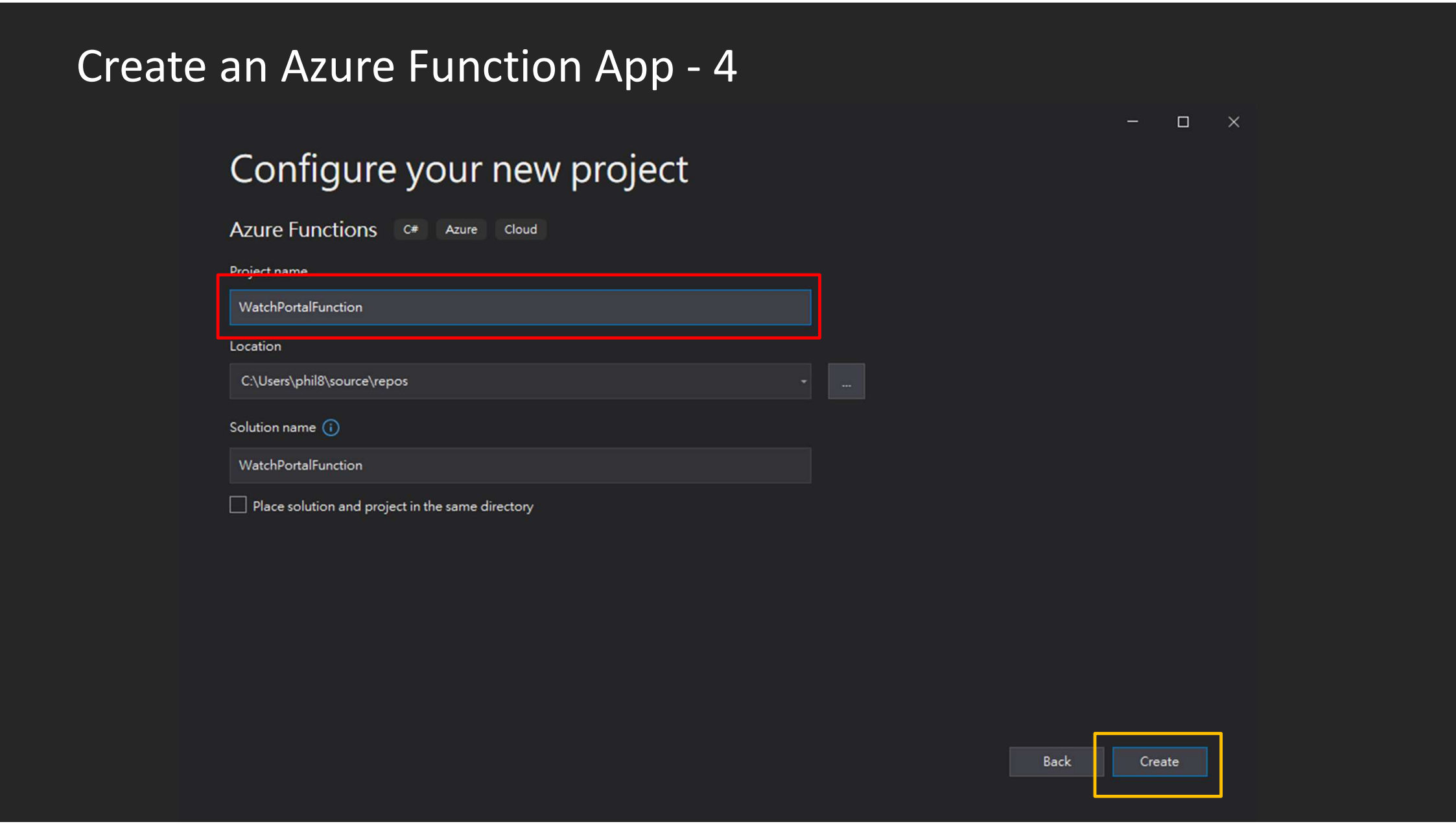
Create an Azure Function App - 2



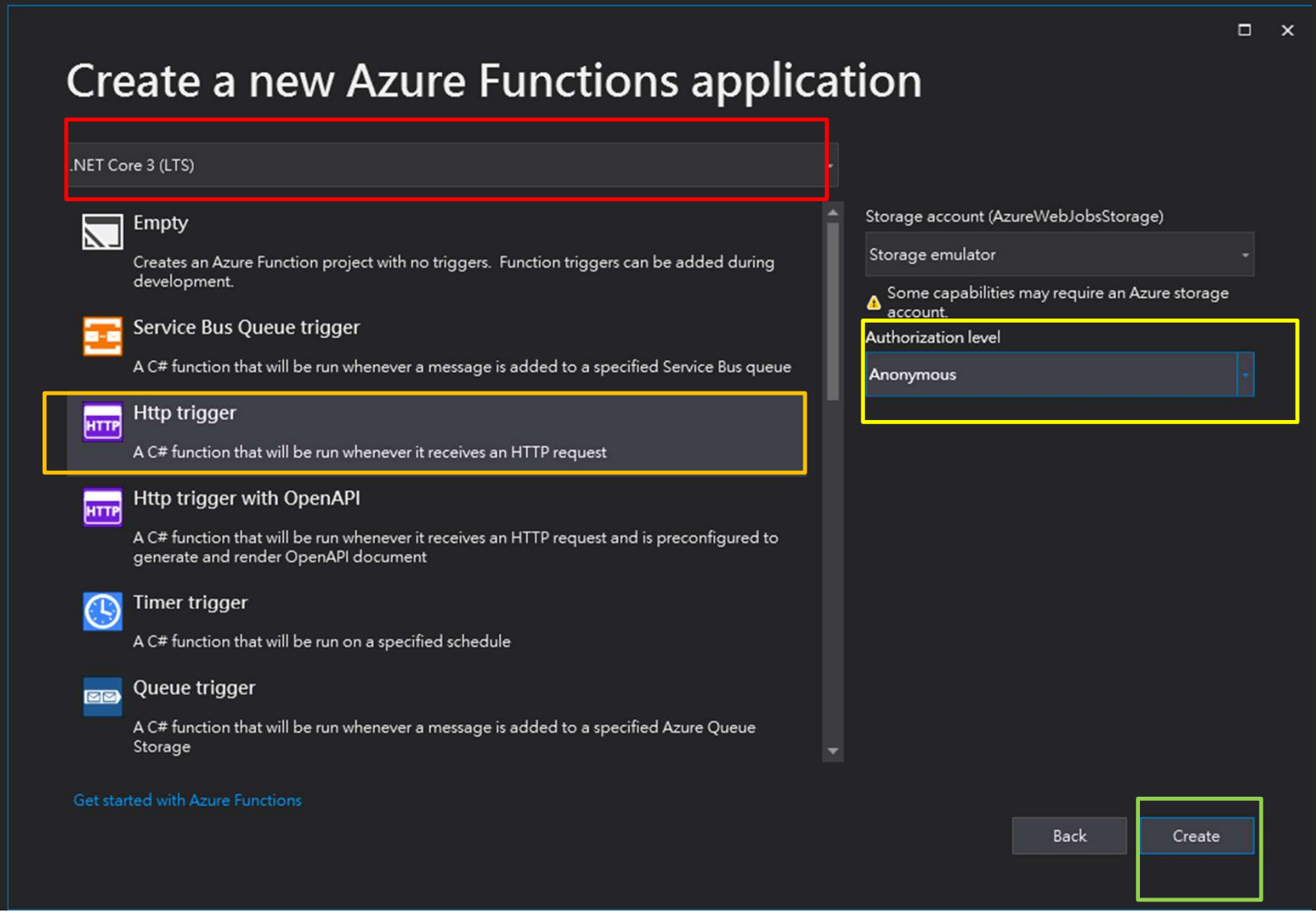
Create an Azure Function App - 3



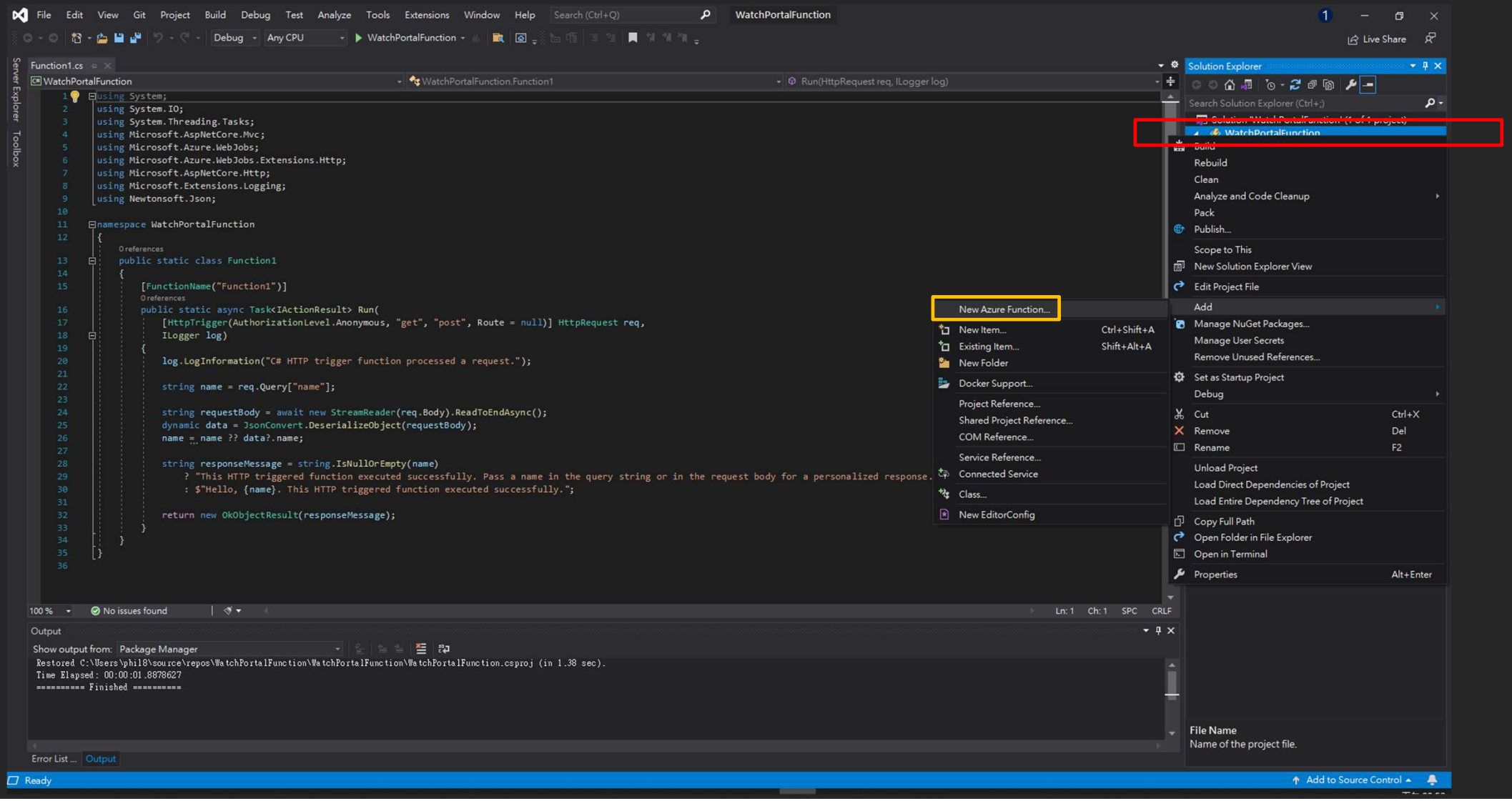
Create an Azure Function App - 4



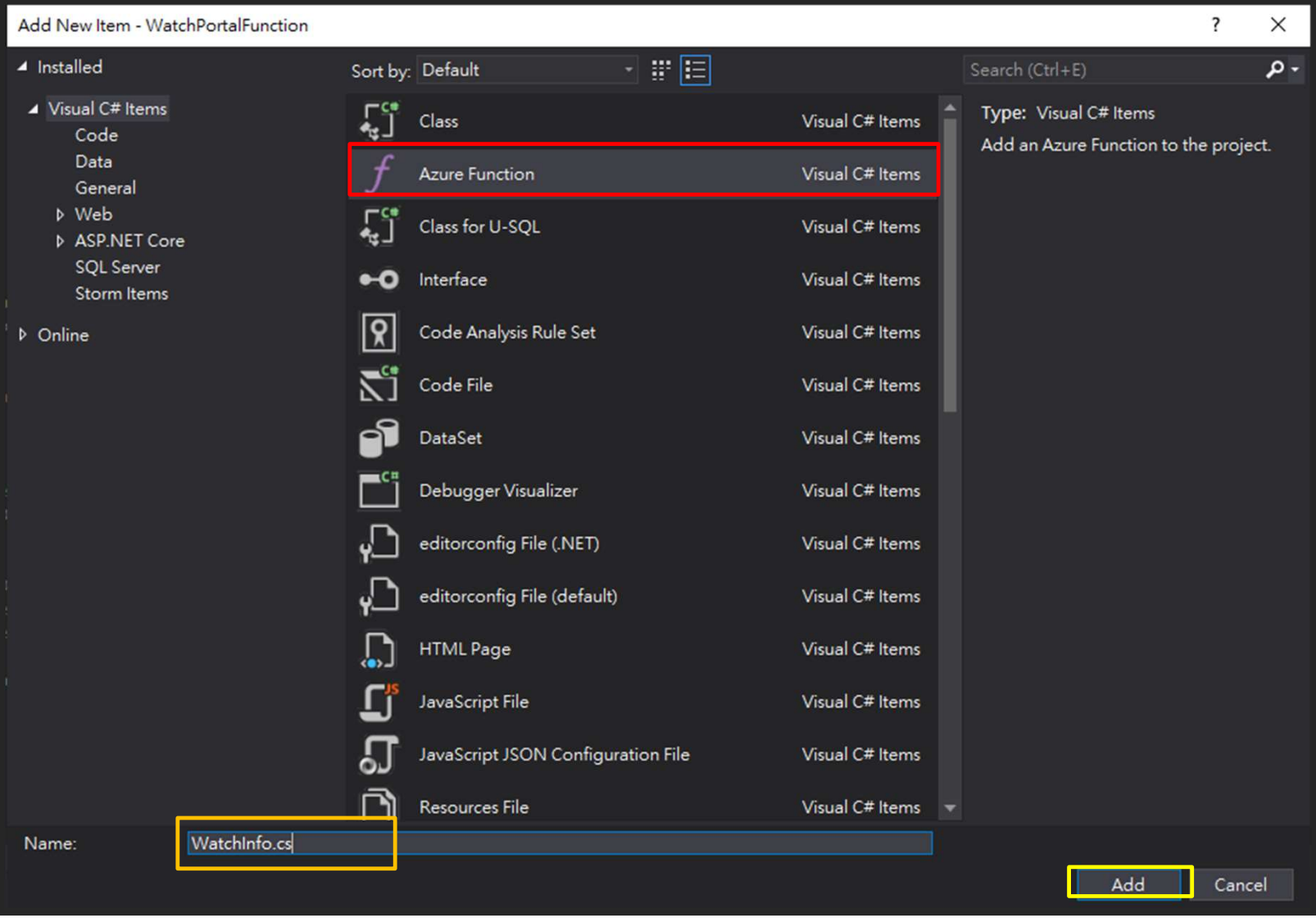
Create an Azure Function App - 5



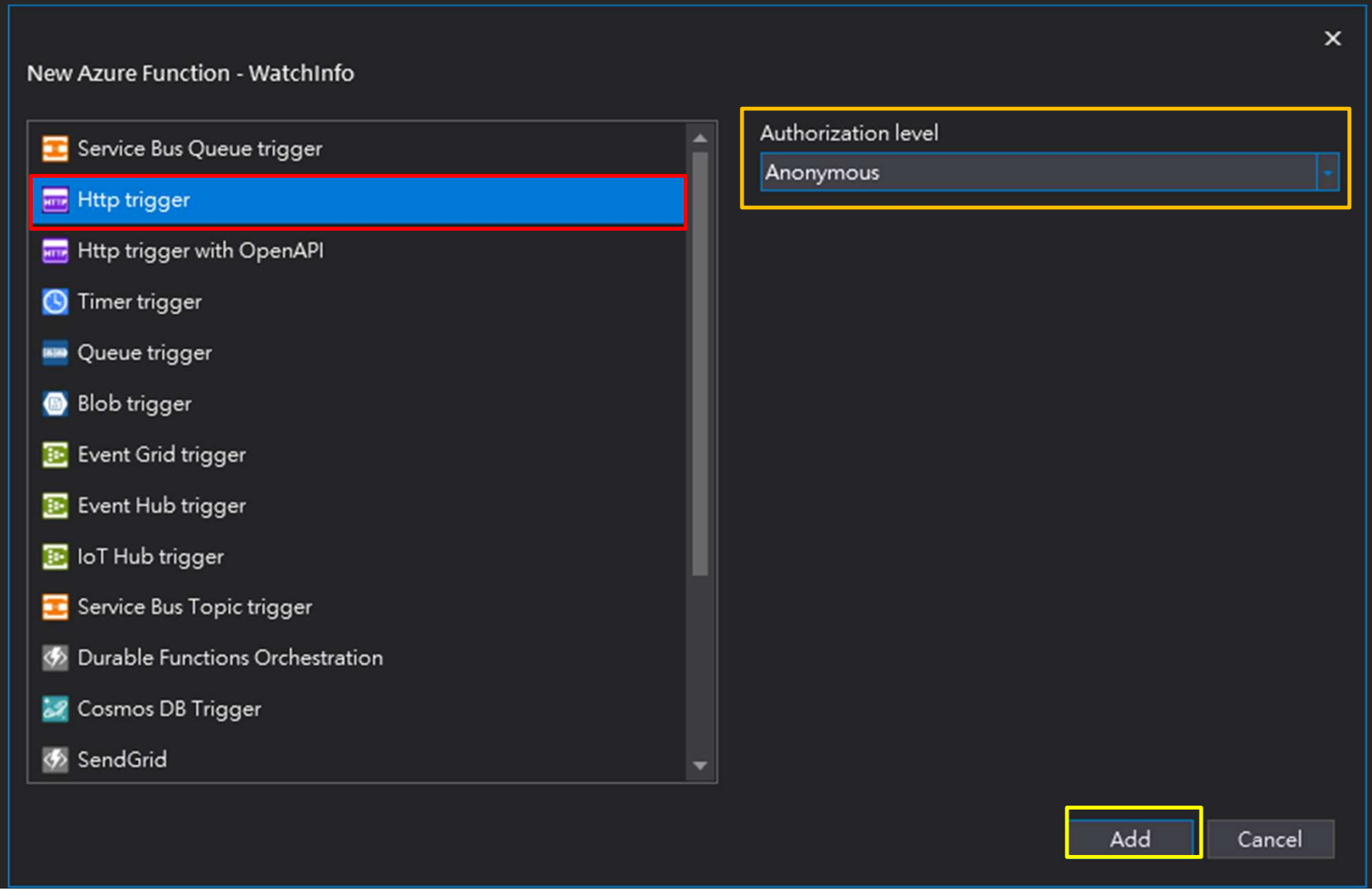
Create the WatchInfo Azure Function - 1



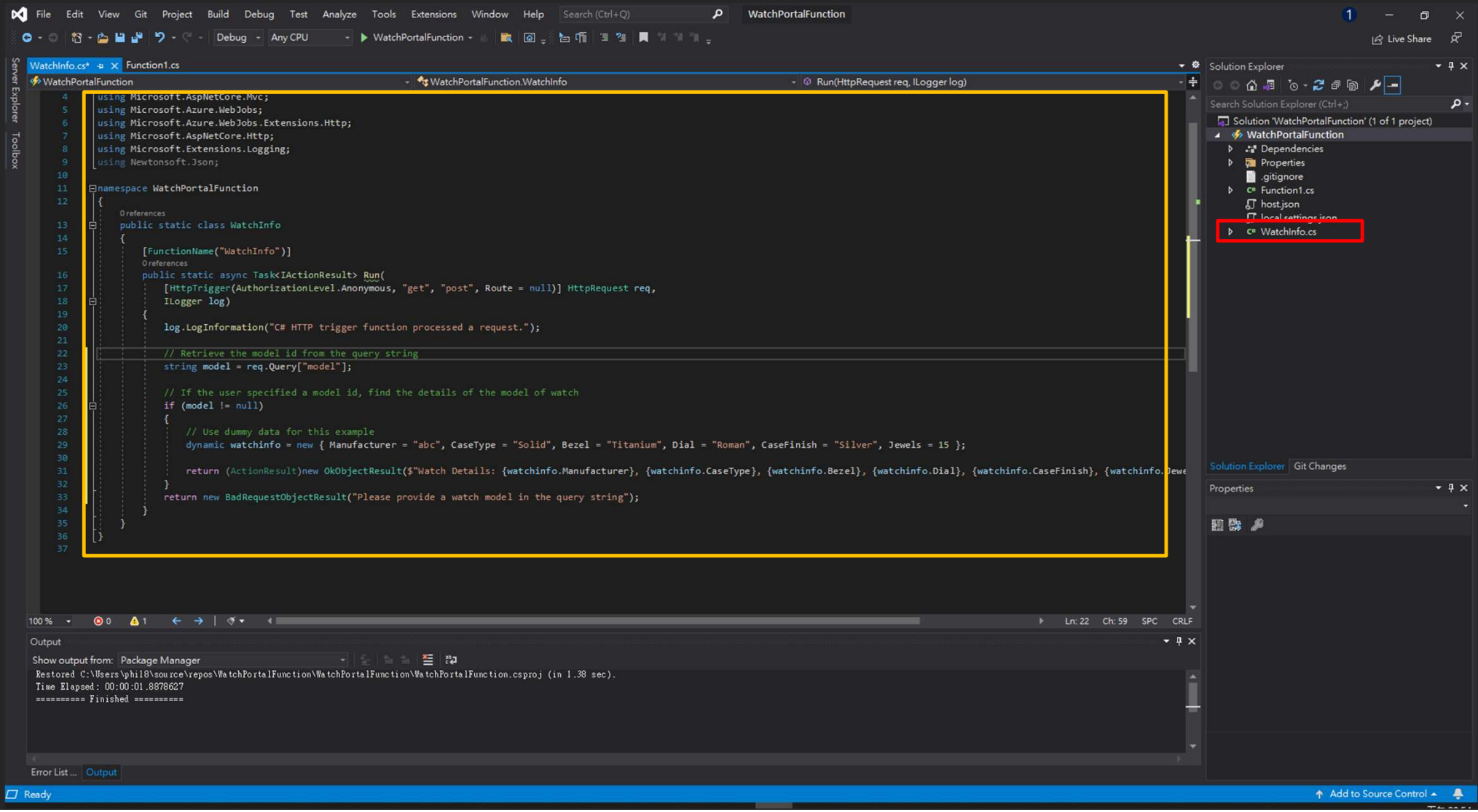
Create the WatchInfo Azure Function - 2



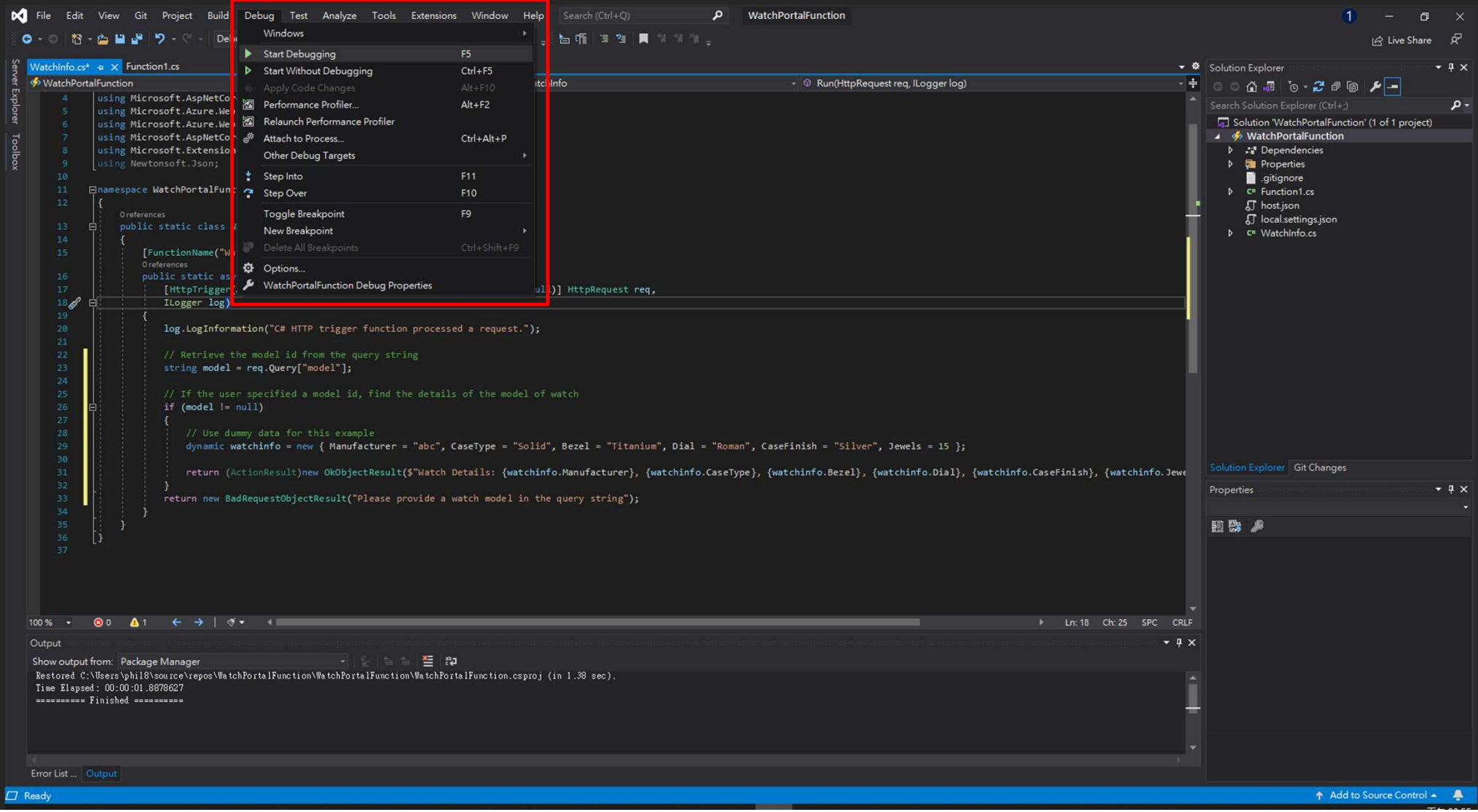
Create the WatchInfo Azure Function - 3



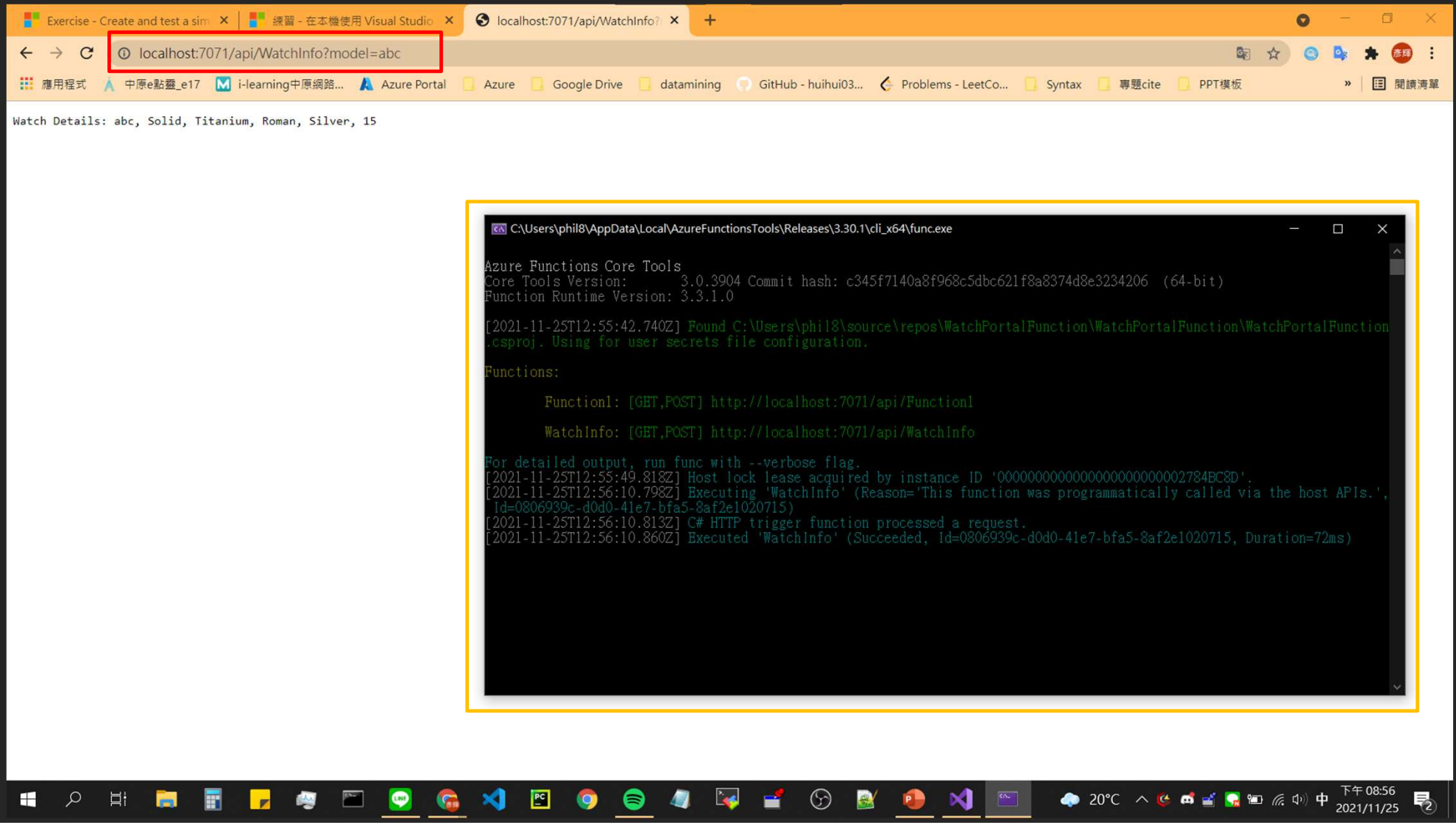
Create the WatchInfo Azure Function - 4



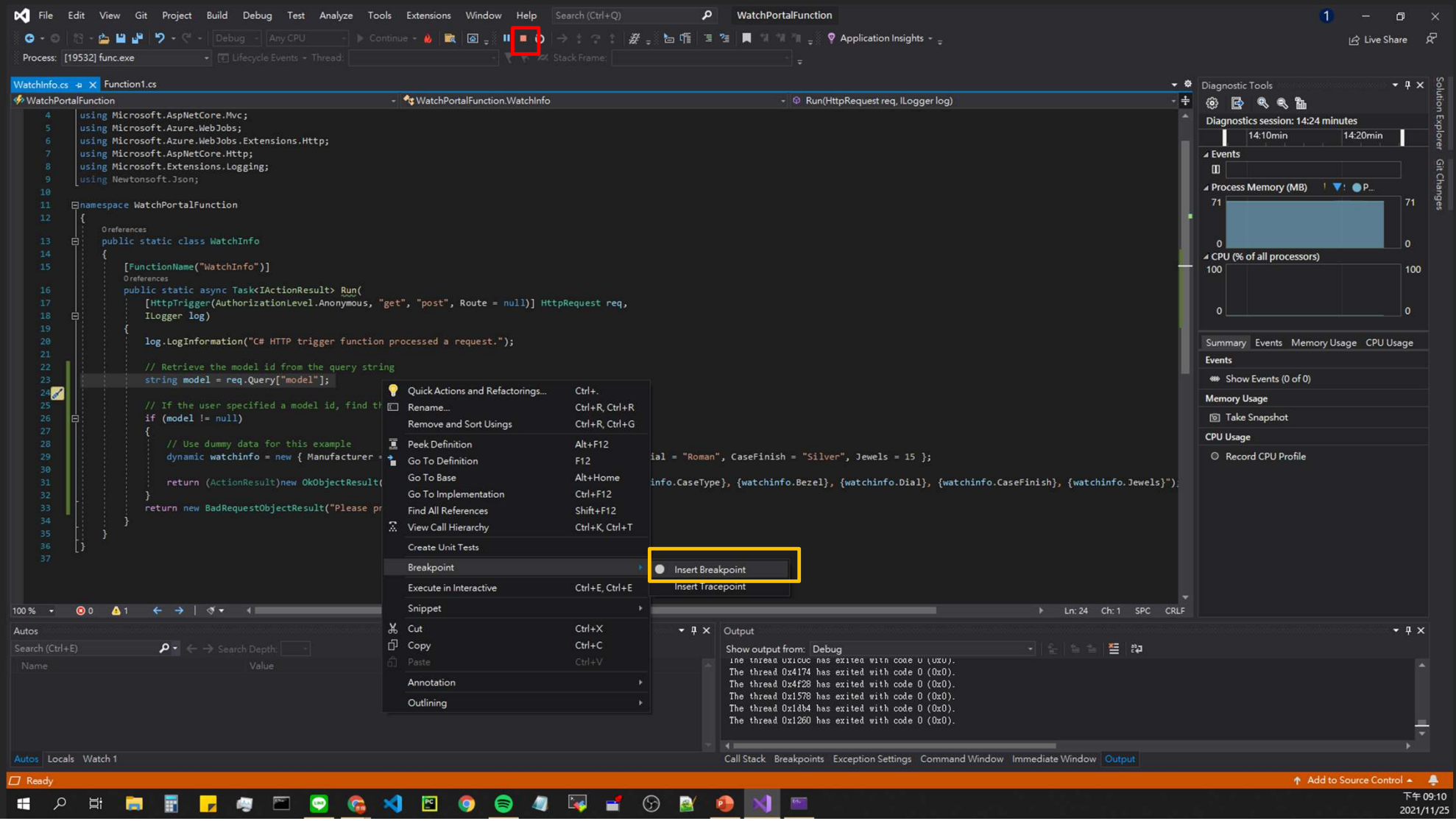
Test the Azure Function locally - 1



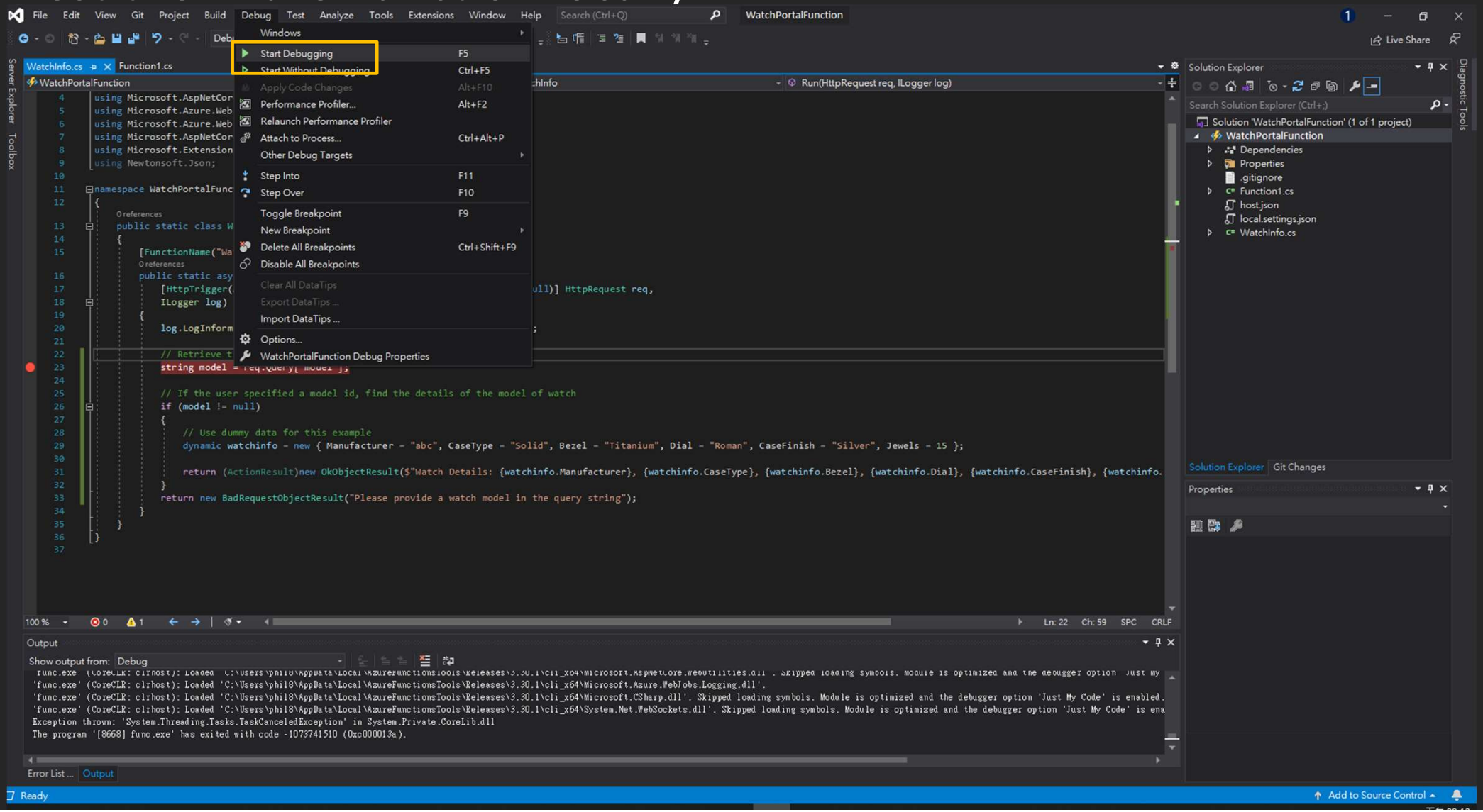
Test the Azure Function locally - 2



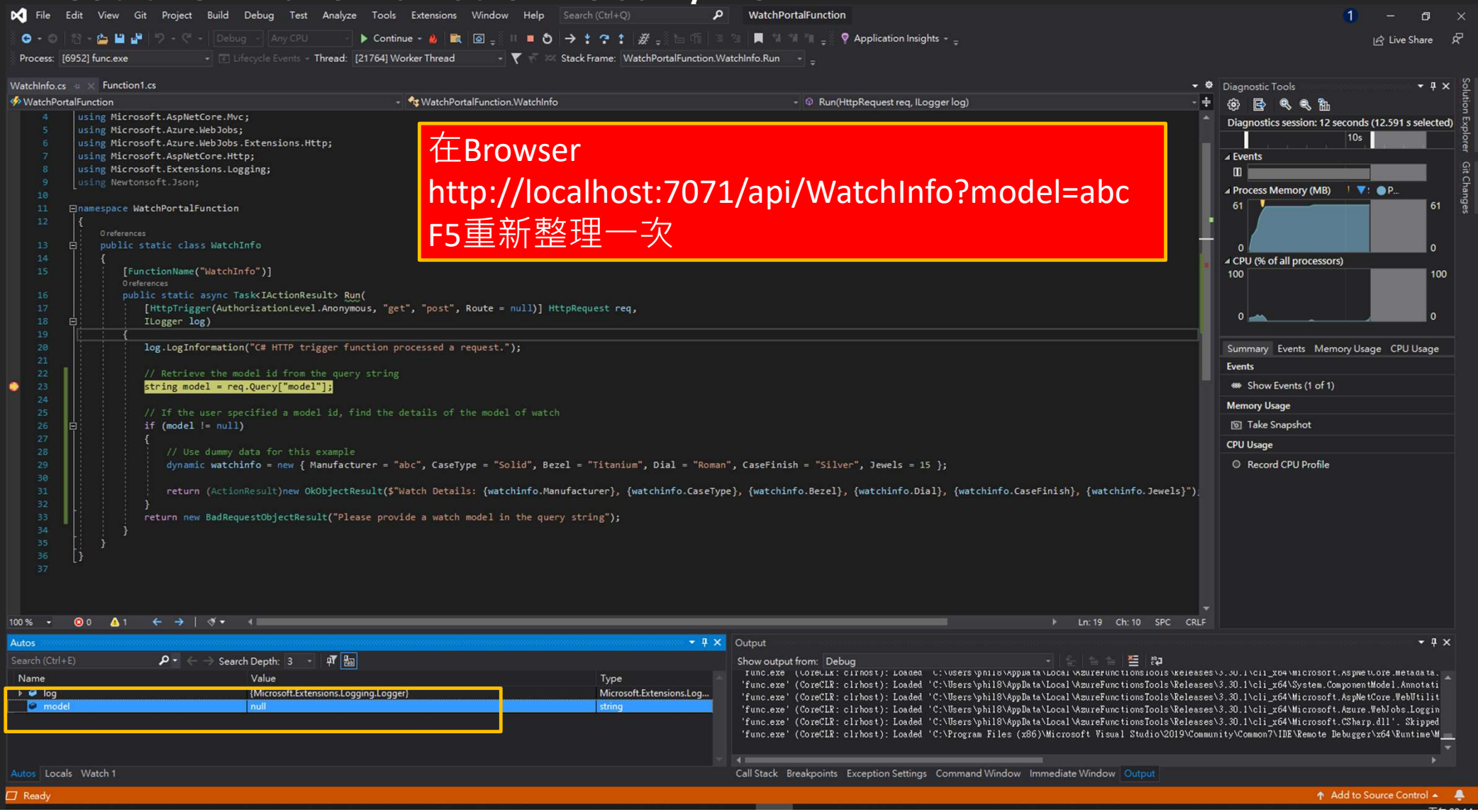
Test the Azure Function locally - 3



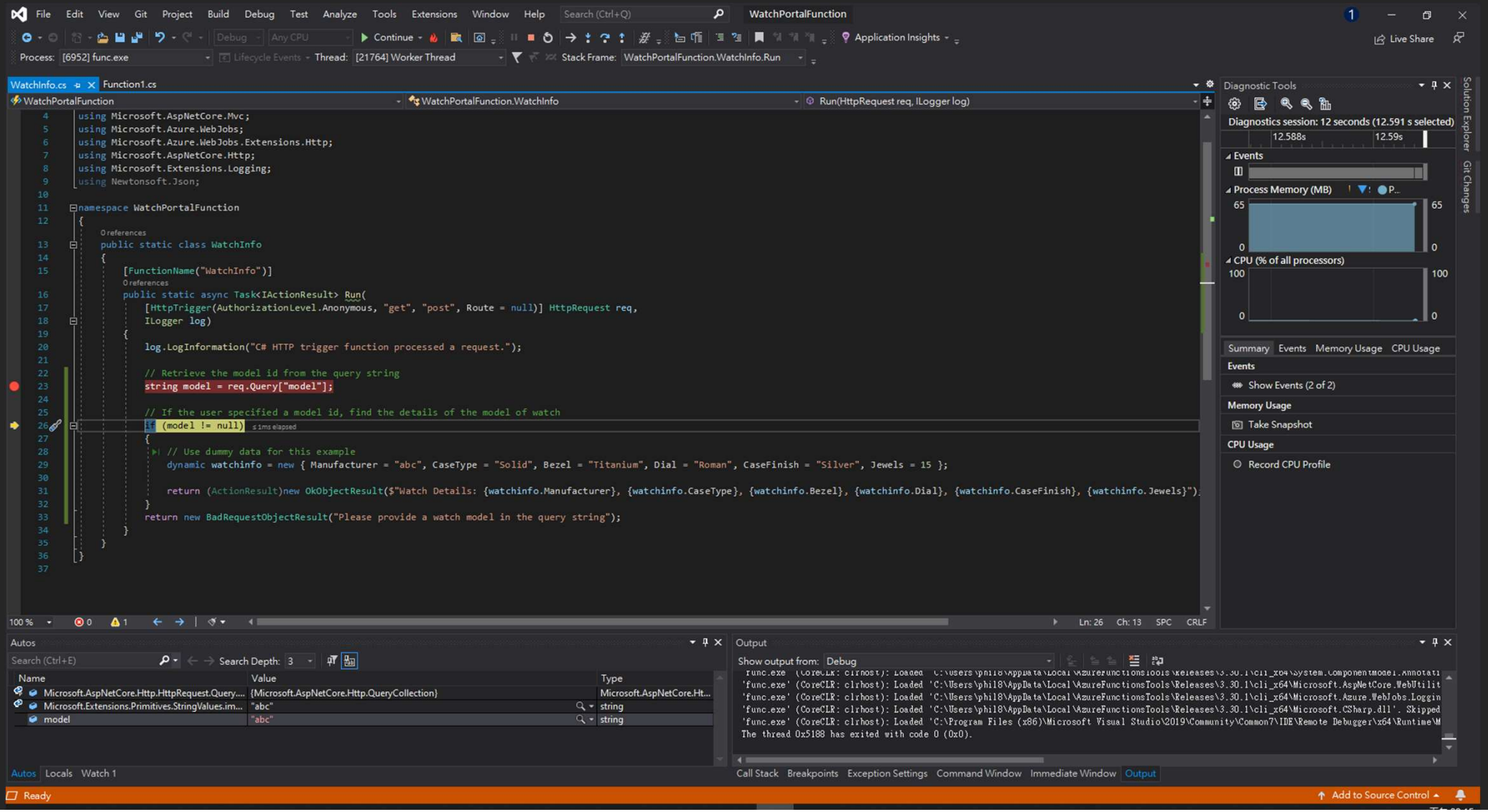
Test the Azure Function locally - 4



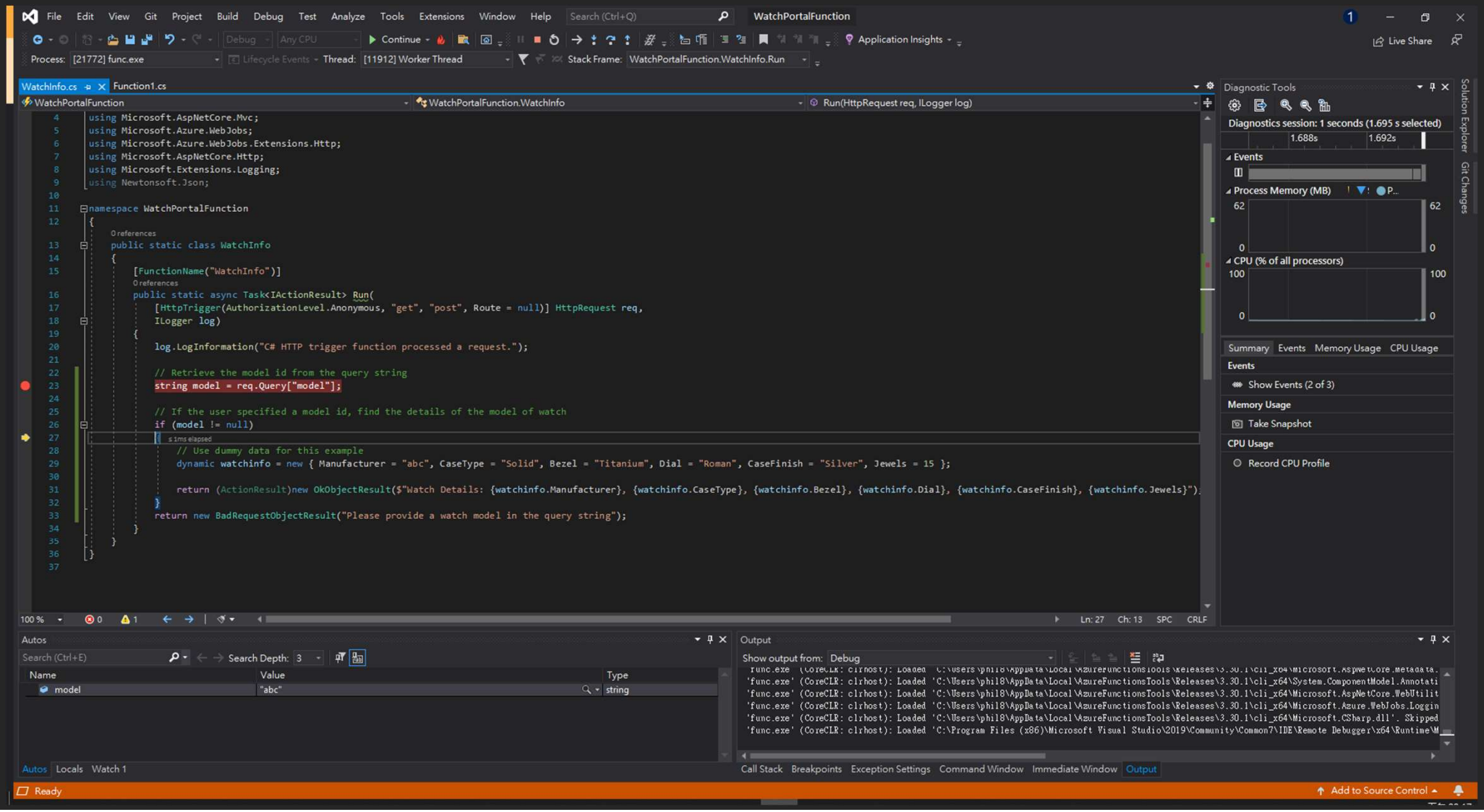
Test the Azure Function locally - 5



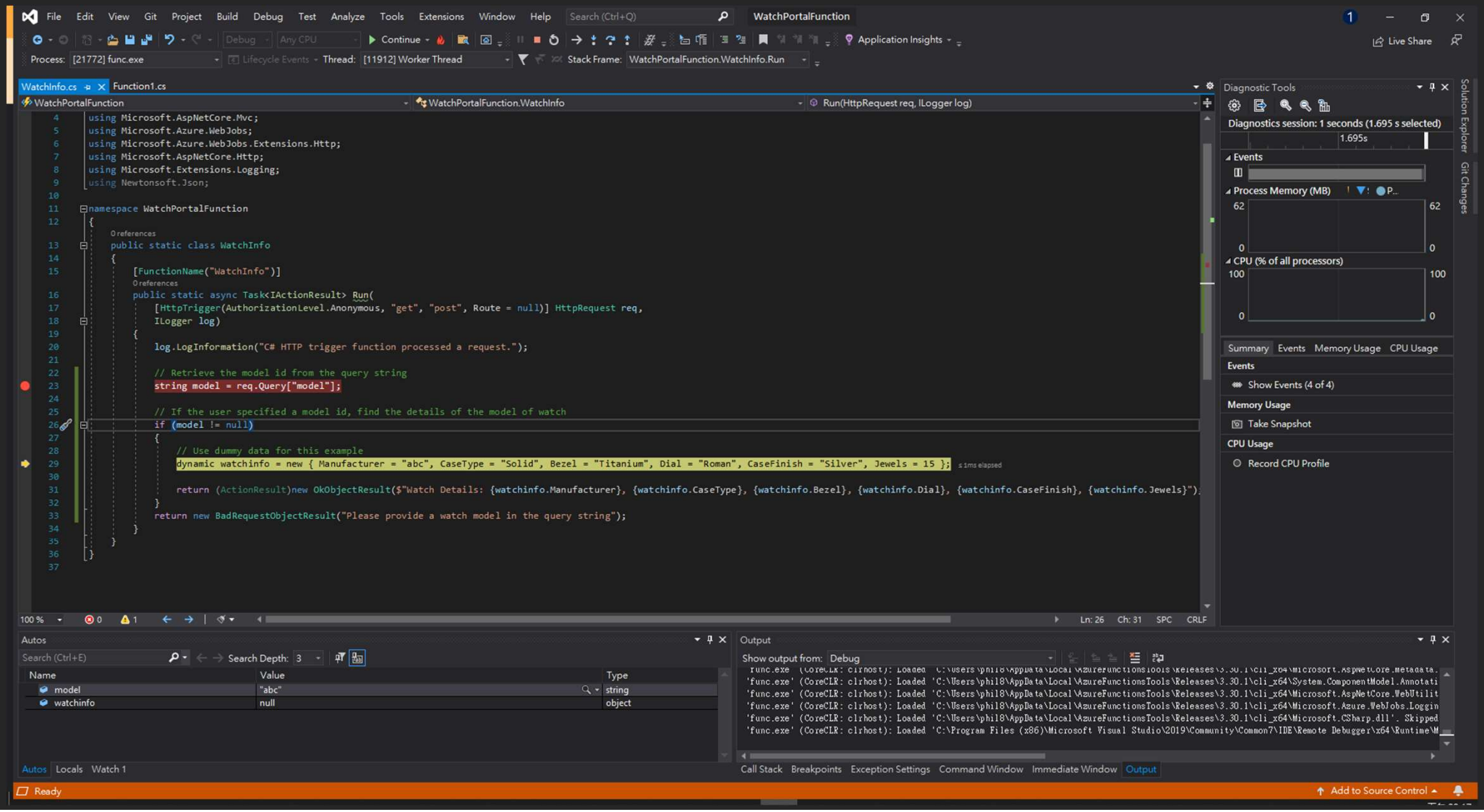
Test the Azure Function locally - 6



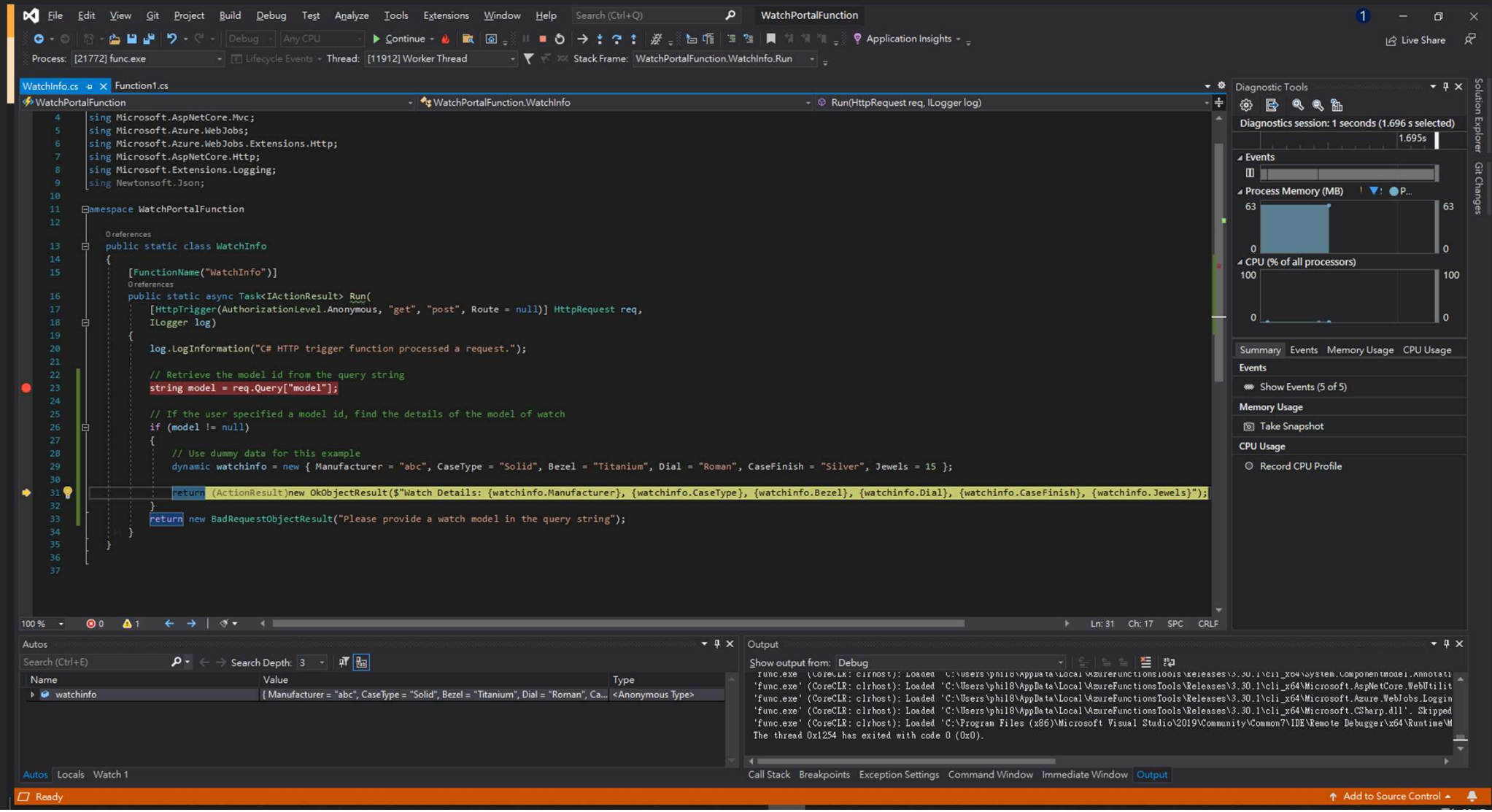
Test the Azure Function locally - 7



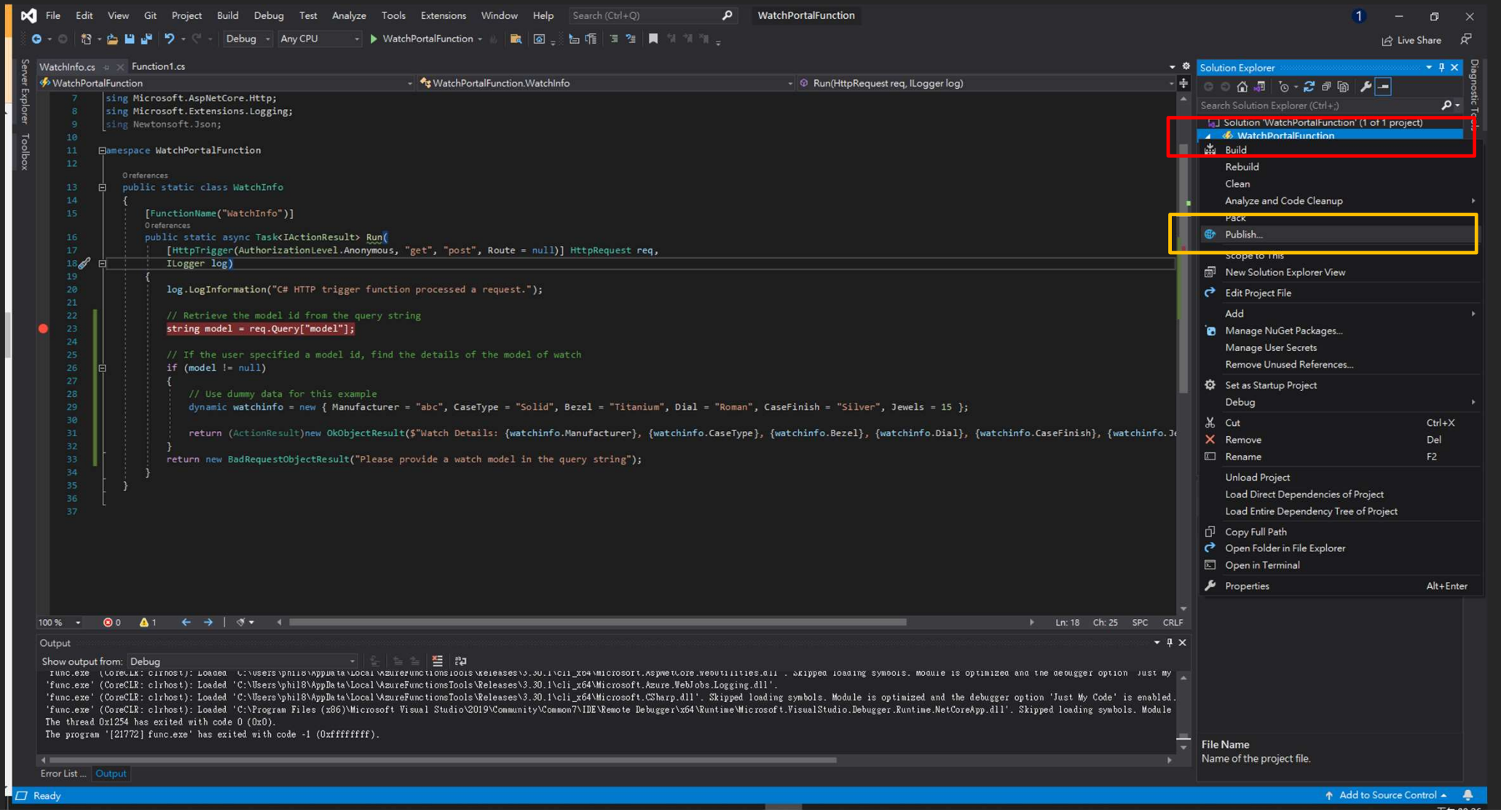
Test the Azure Function locally - 8



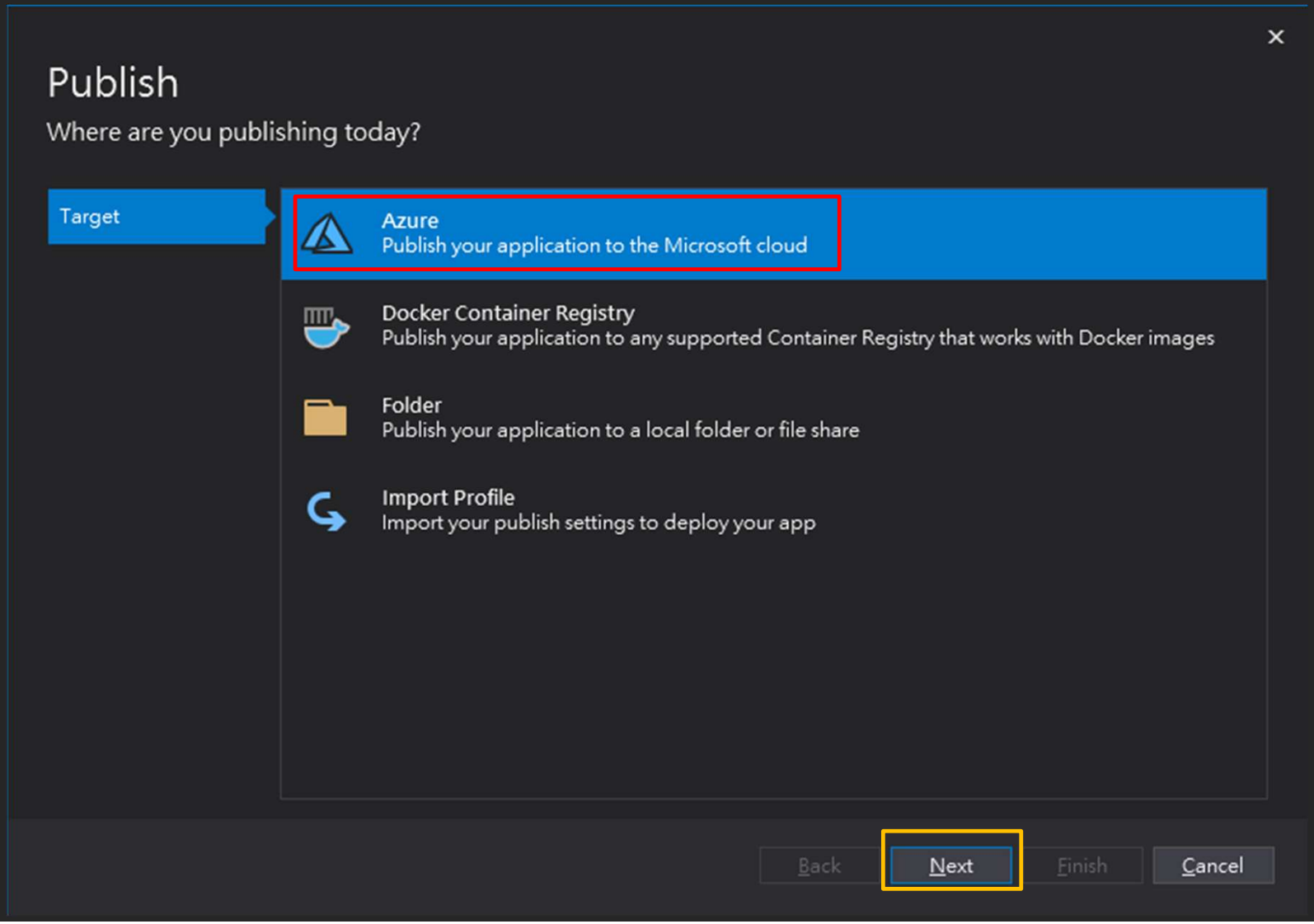
Test the Azure Function locally - 9



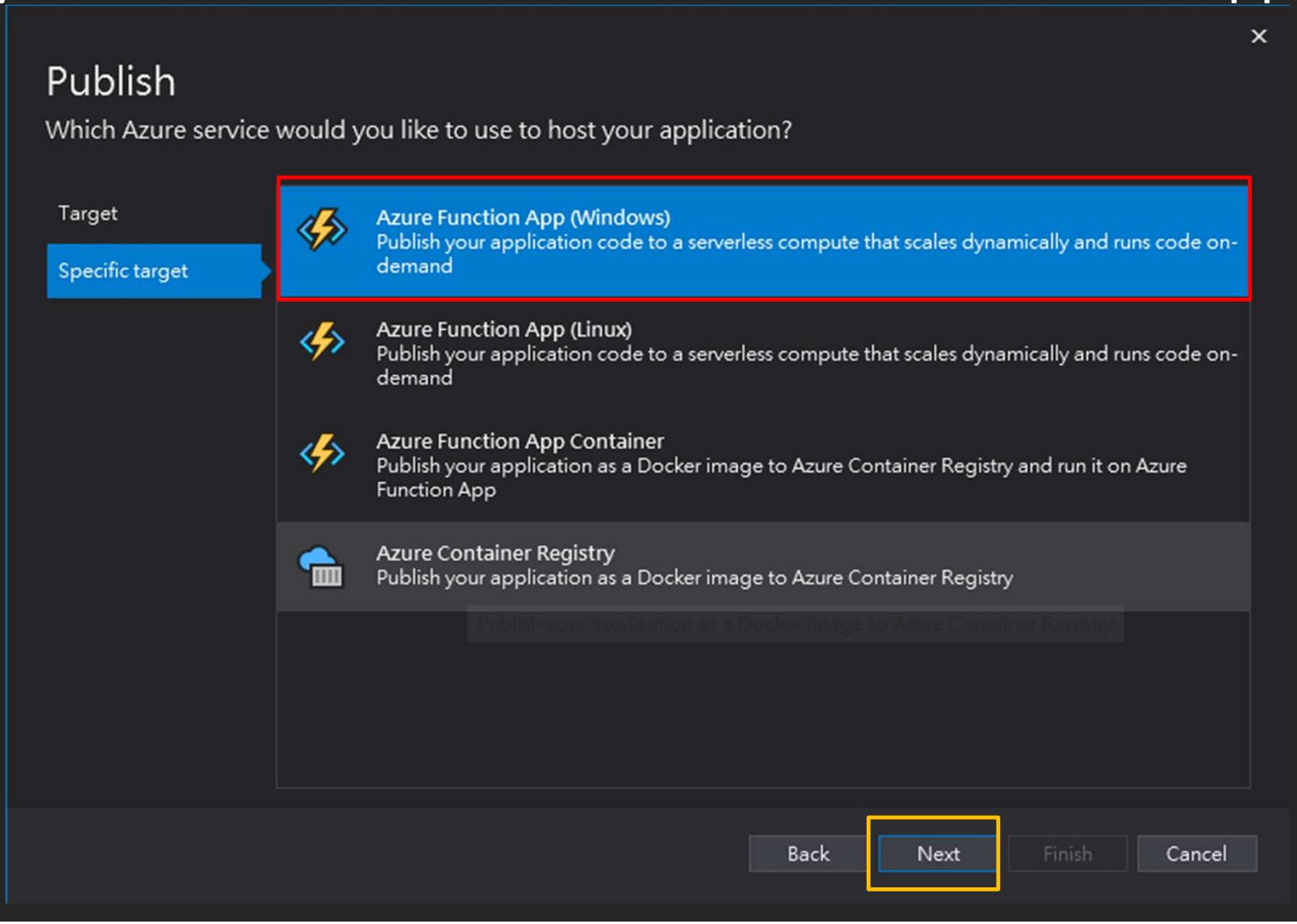
Deploy the WatchInfo function to the Azure Function App - 1



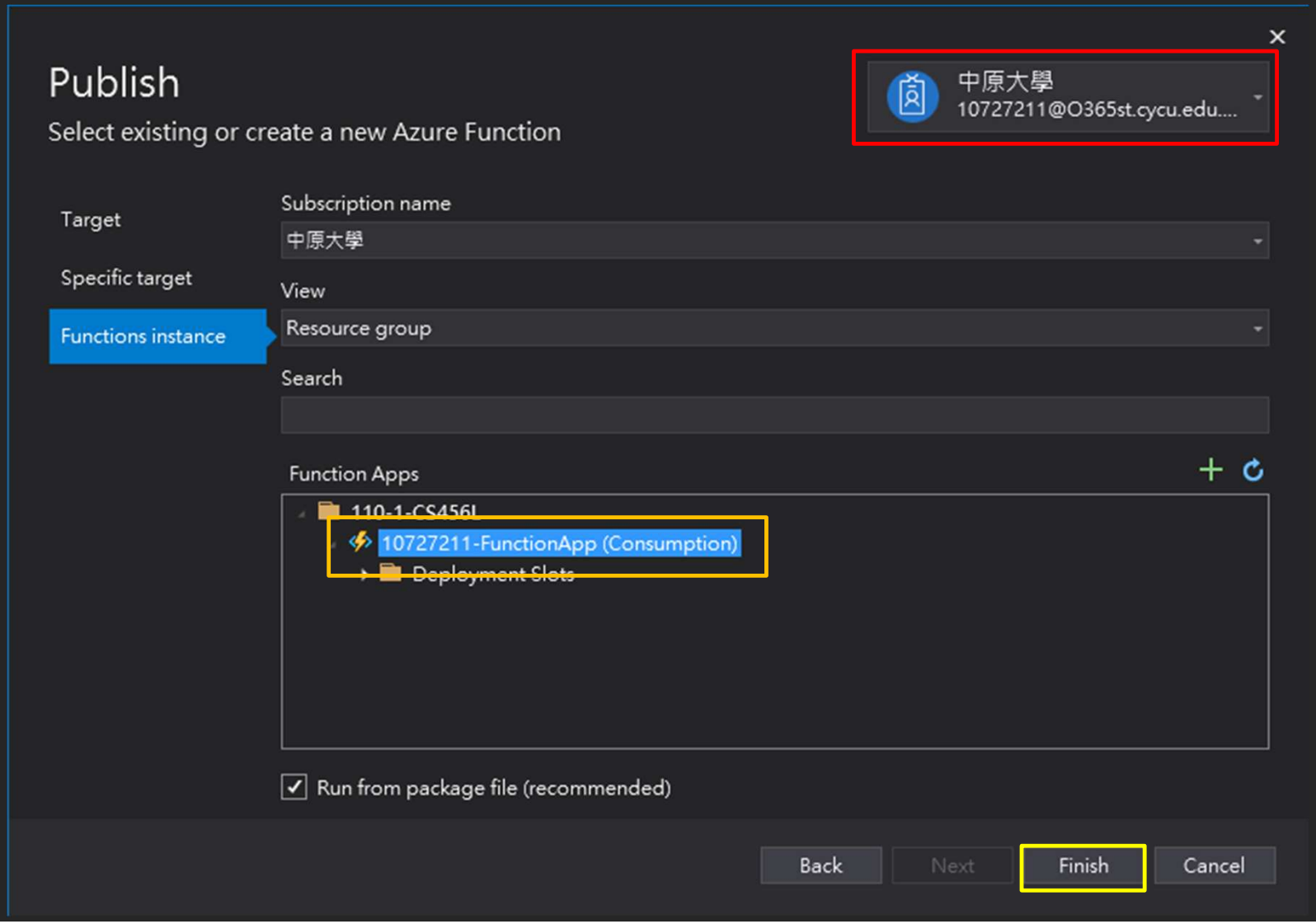
Deploy the WatchInfo function to the Azure Function App - 2



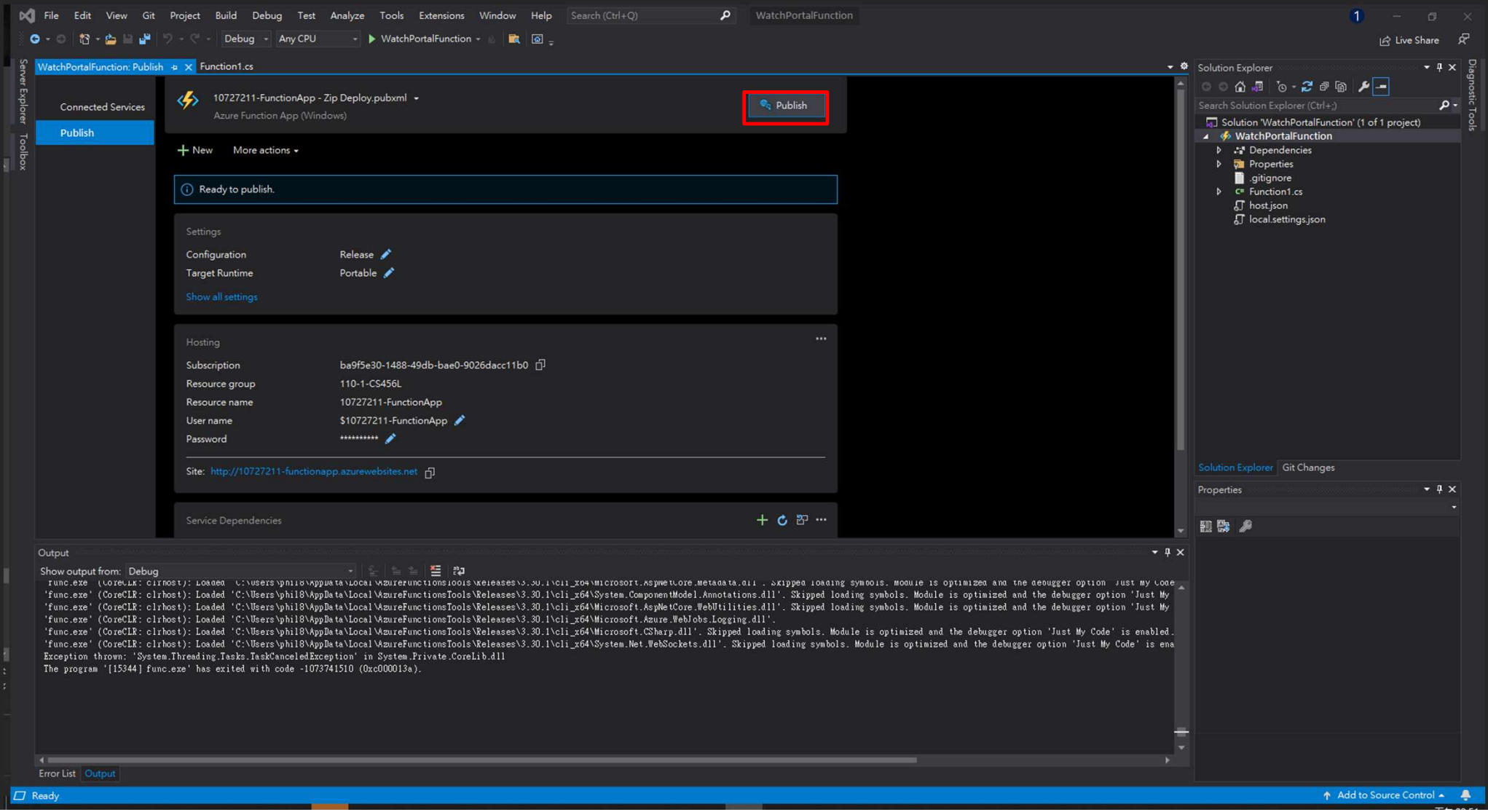
Deploy the WatchInfo function to the Azure Function App - 3



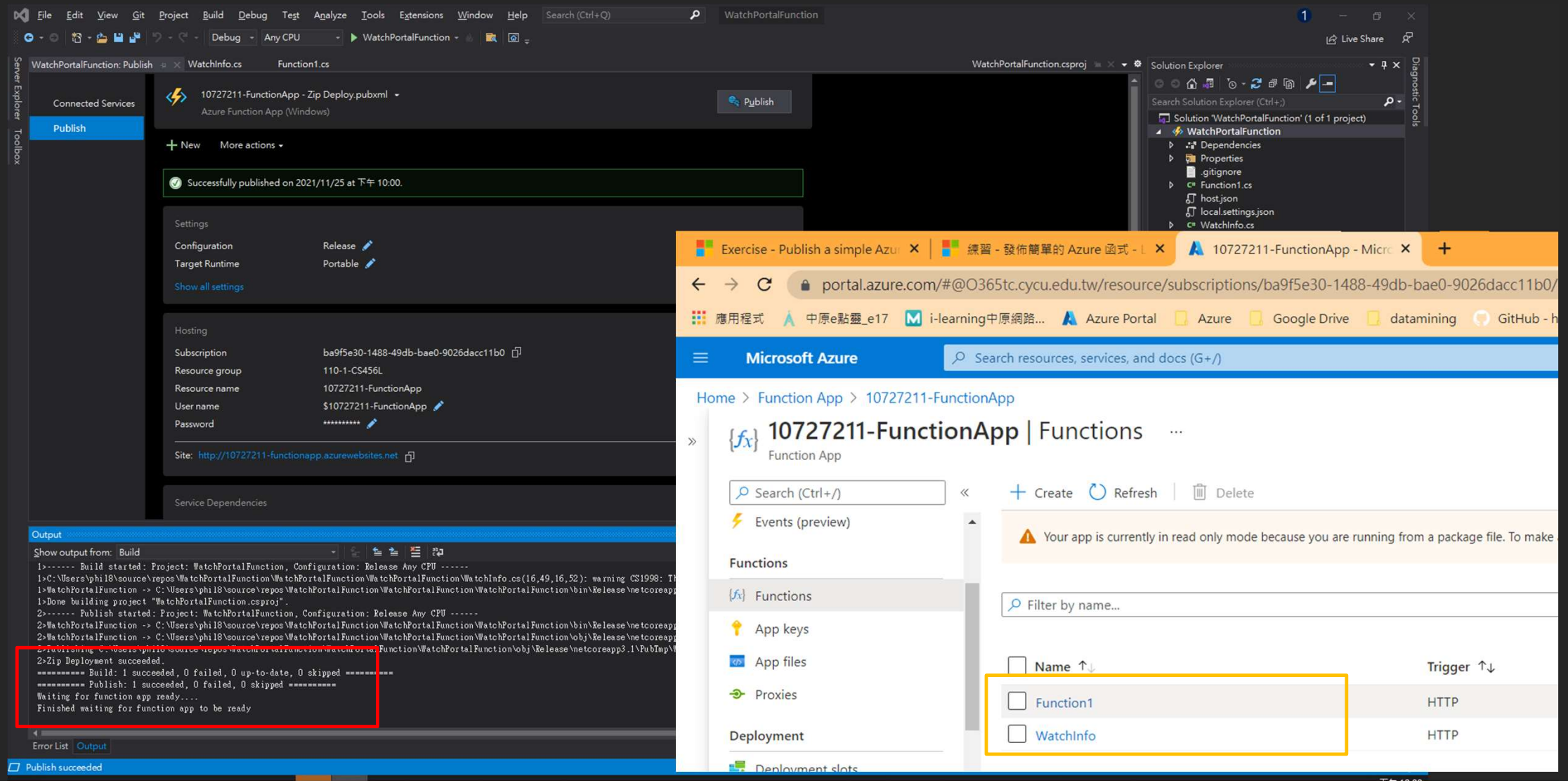
Deploy the WatchInfo function to the Azure Function App - 4



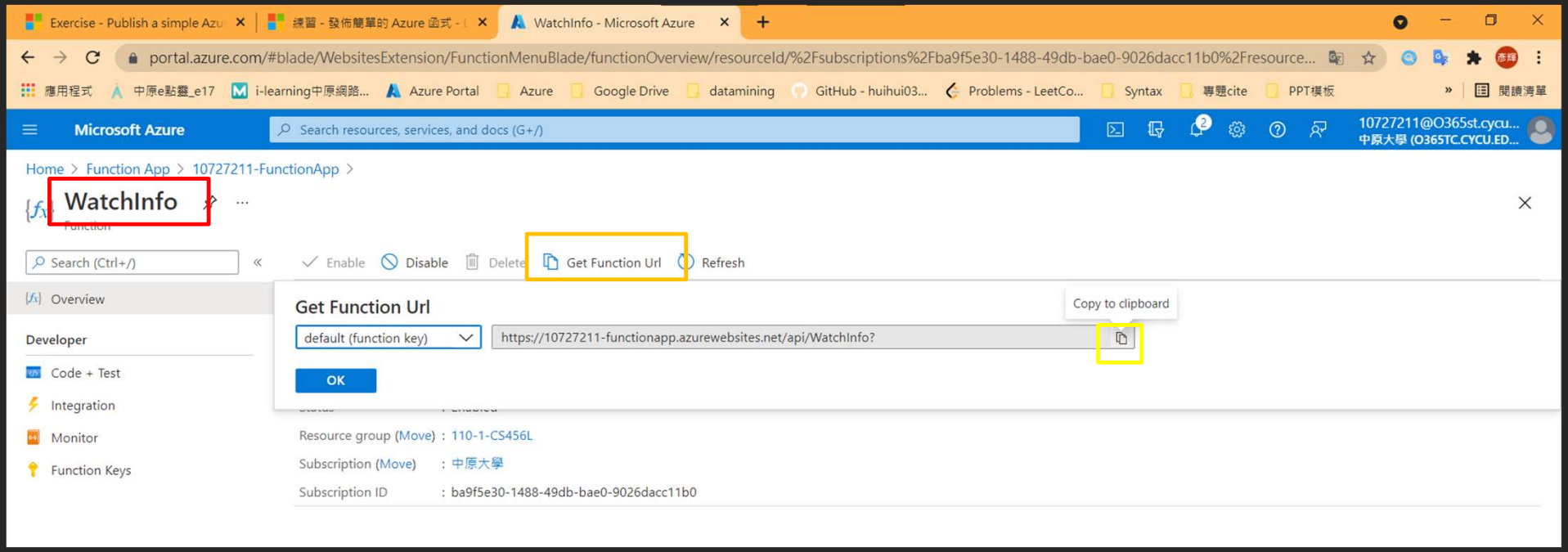
Deploy the WatchInfo function to the Azure Function App - 5

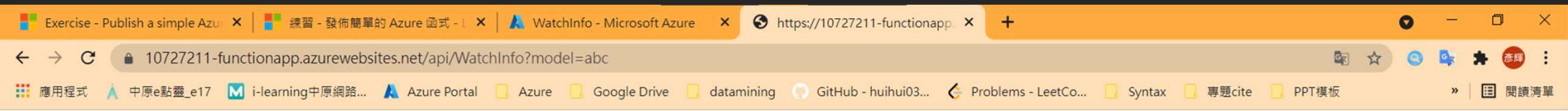


Deploy the WatchInfo function to the Azure Function App – 6



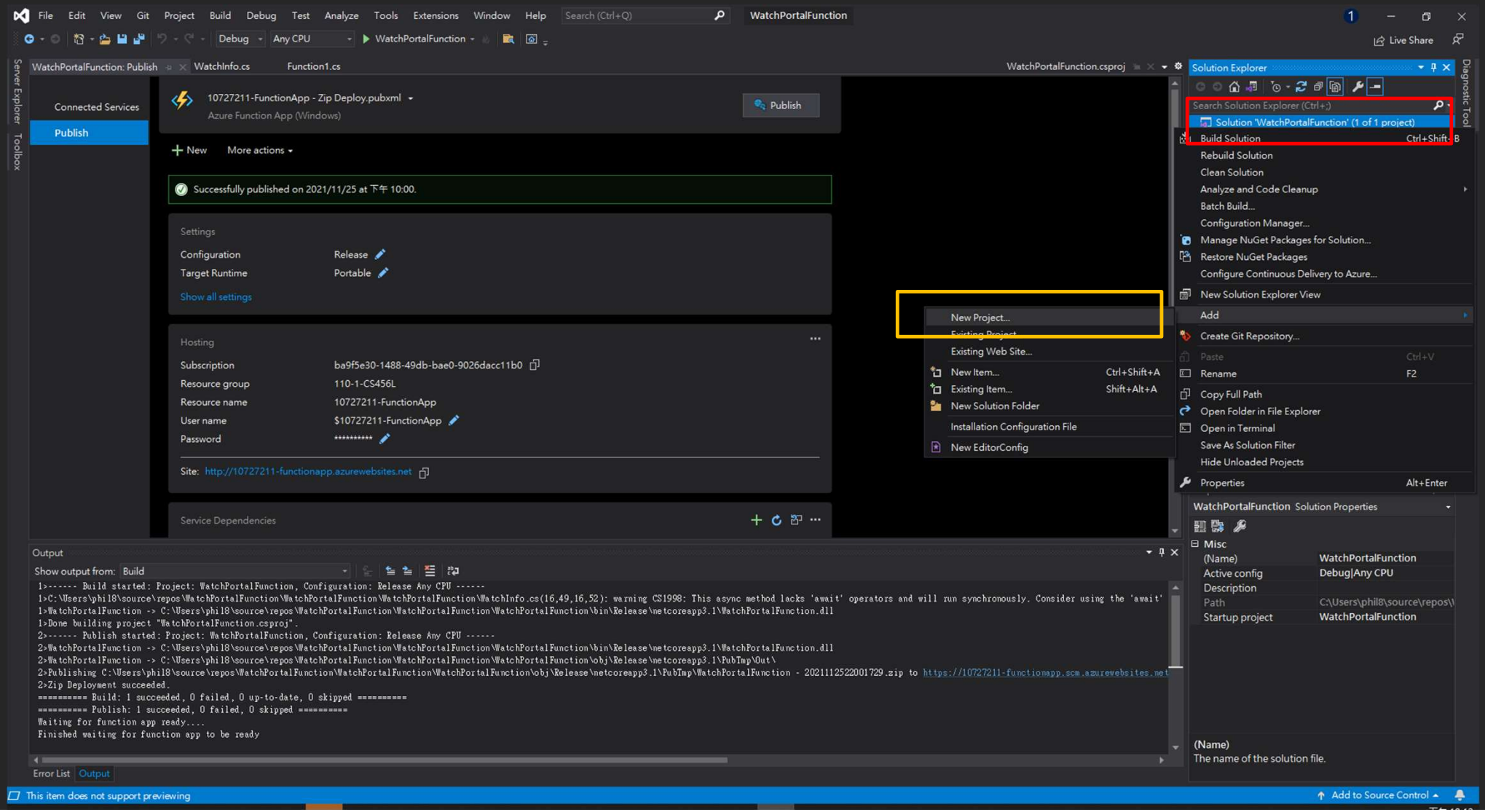
Verify the functions have been deployed



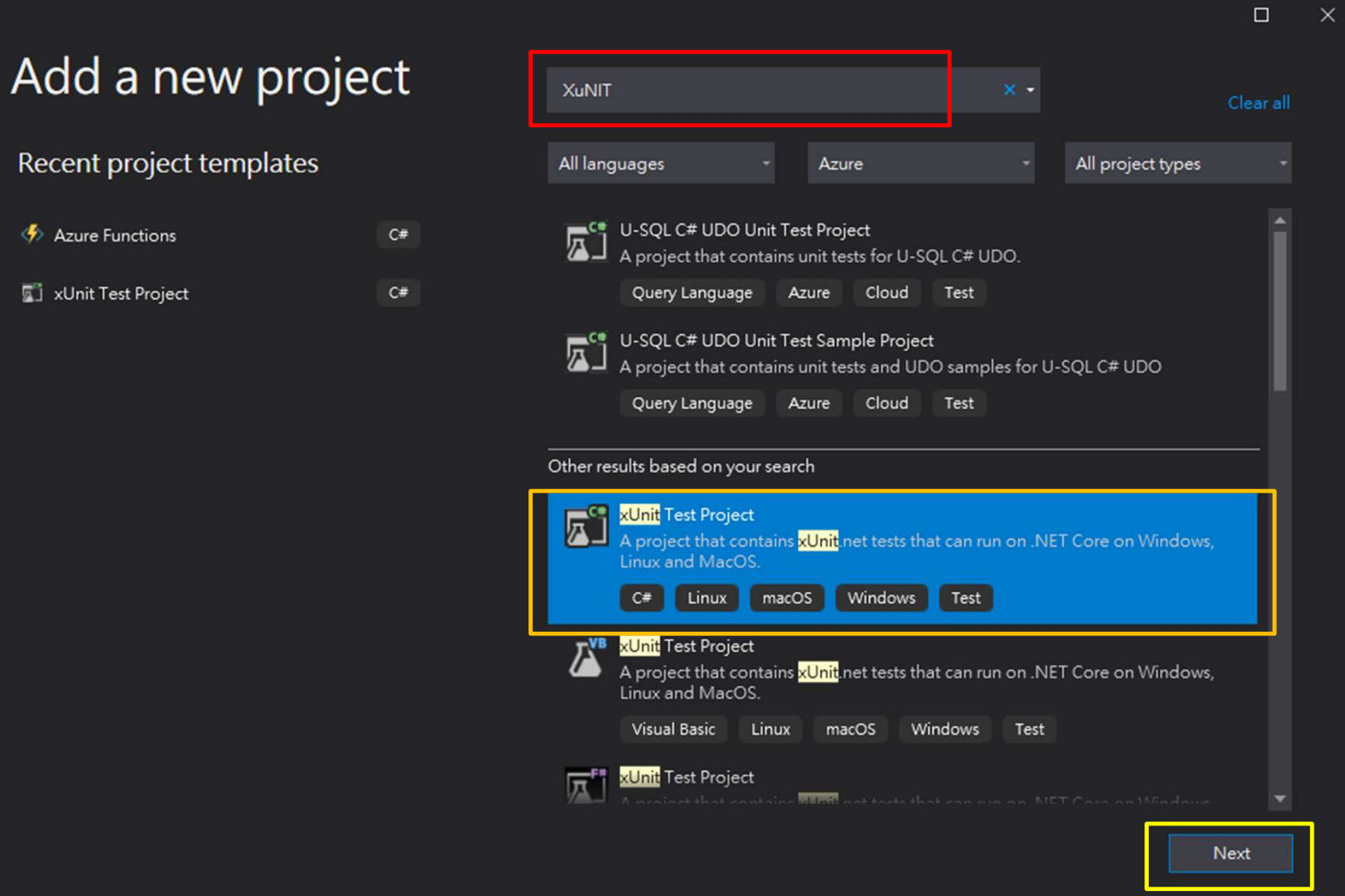



```
Watch Details: abc, Solid, Titanium, Roman, Silver, 15
```

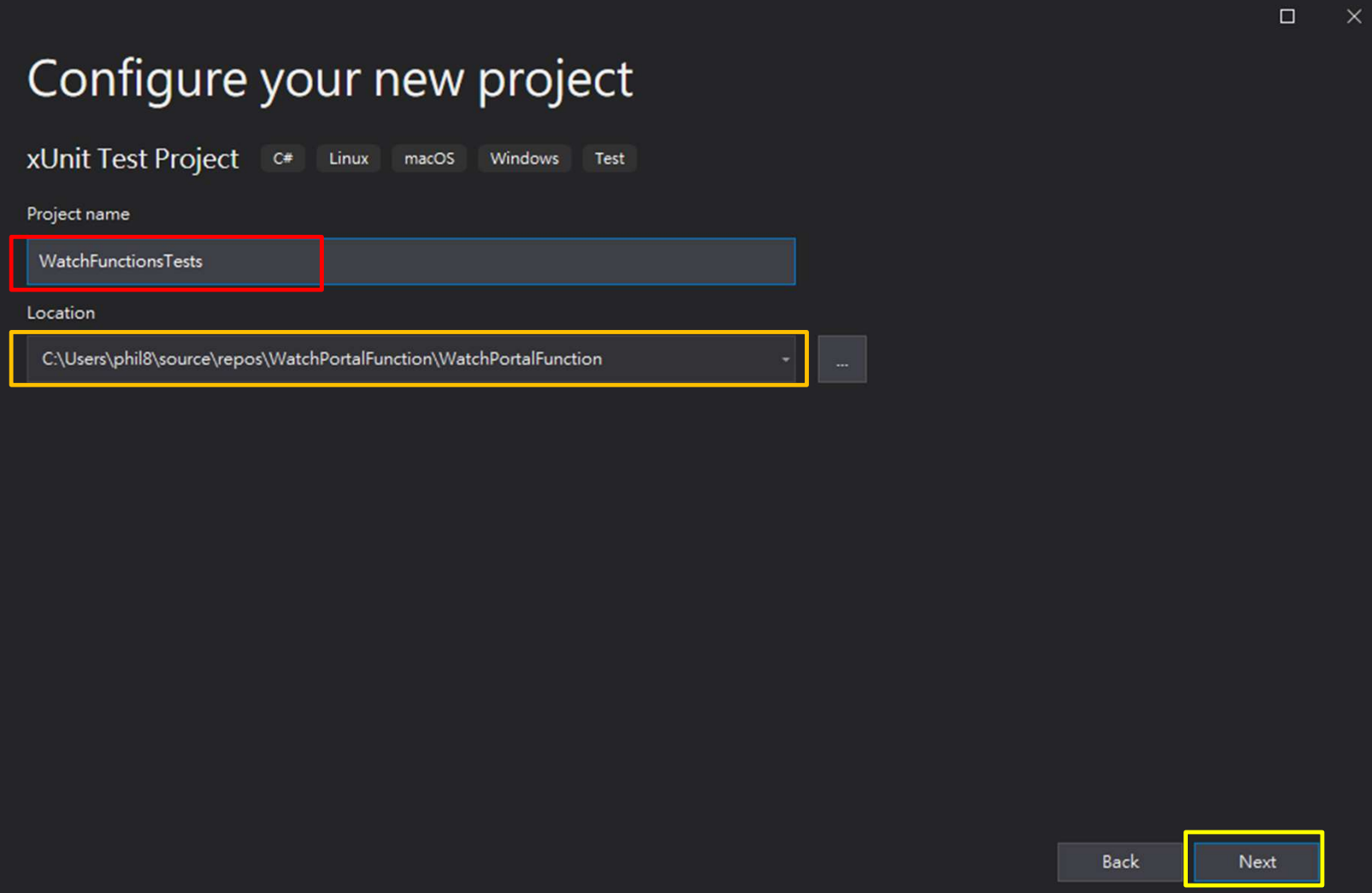
Unit test an Azure Function - 1



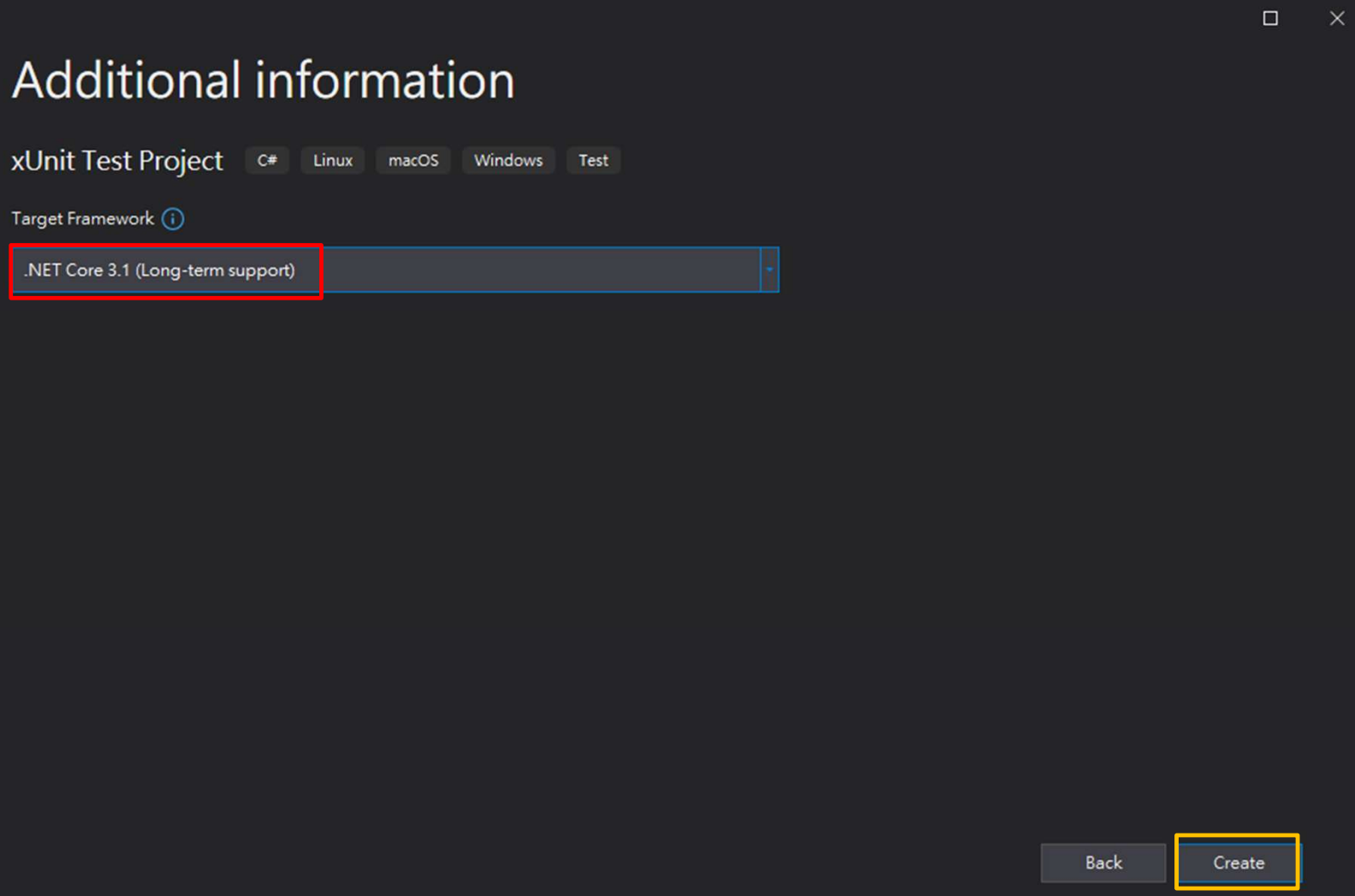
Unit test an Azure Function - 2



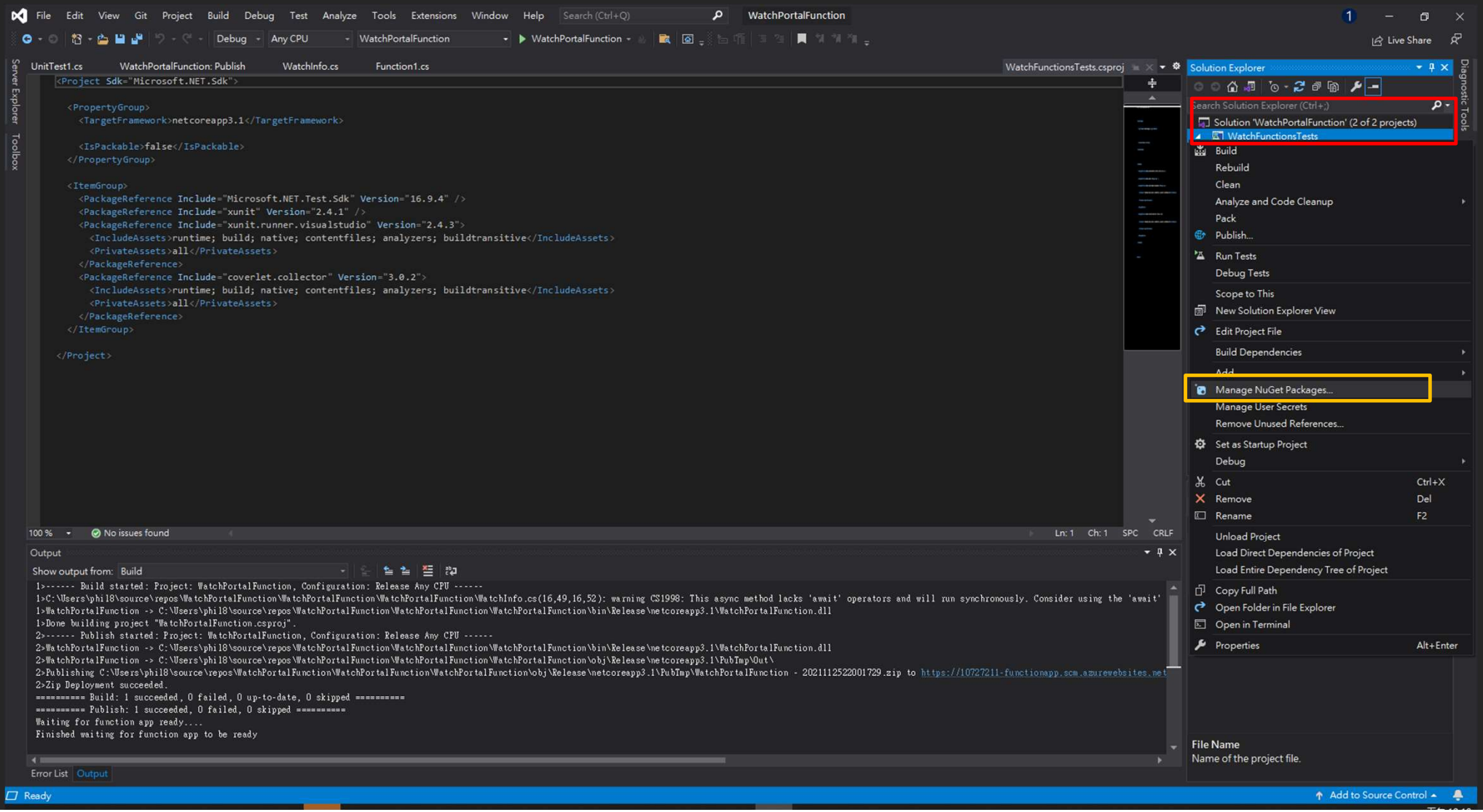
Unit test an Azure Function - 3



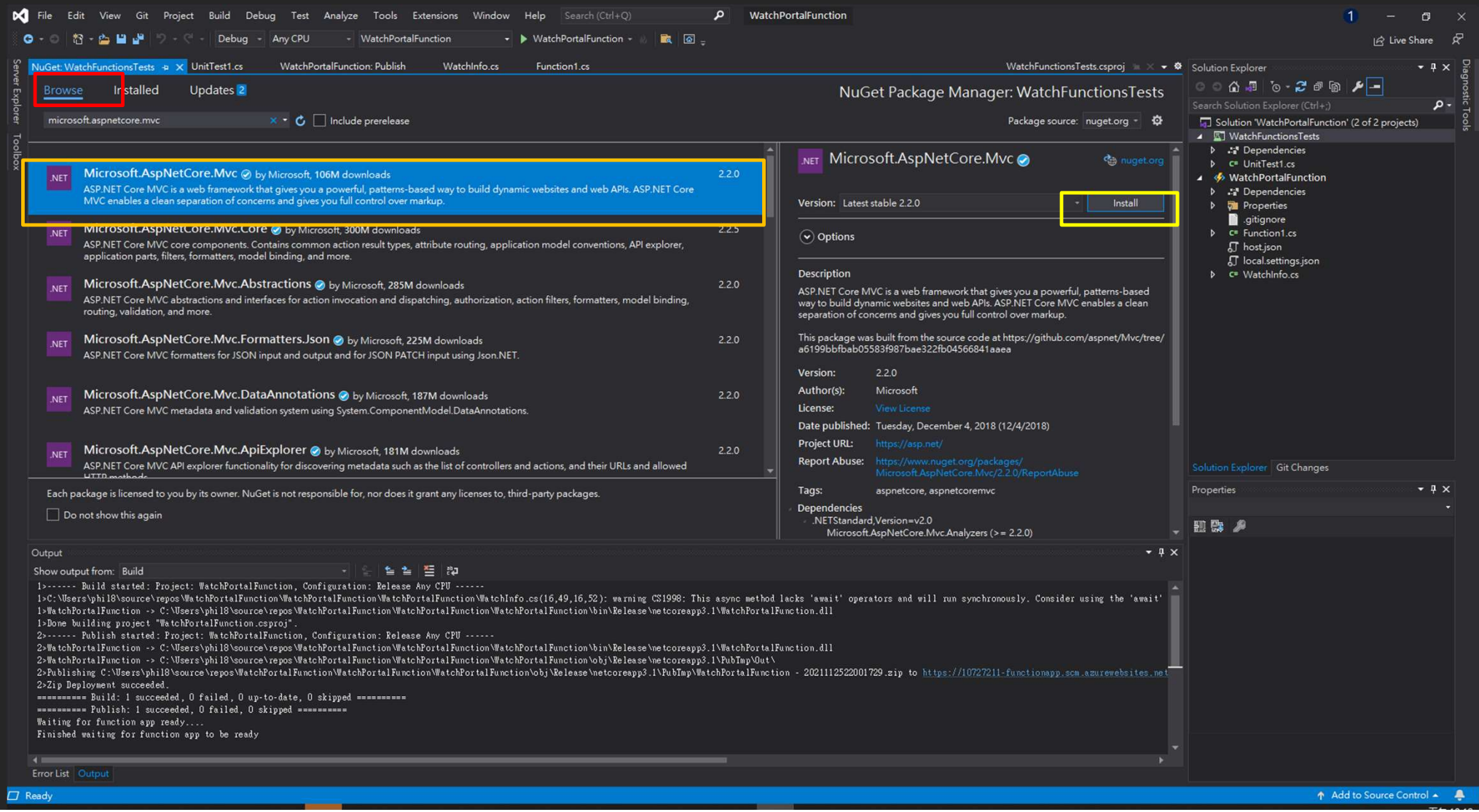
Unit test an Azure Function - 4



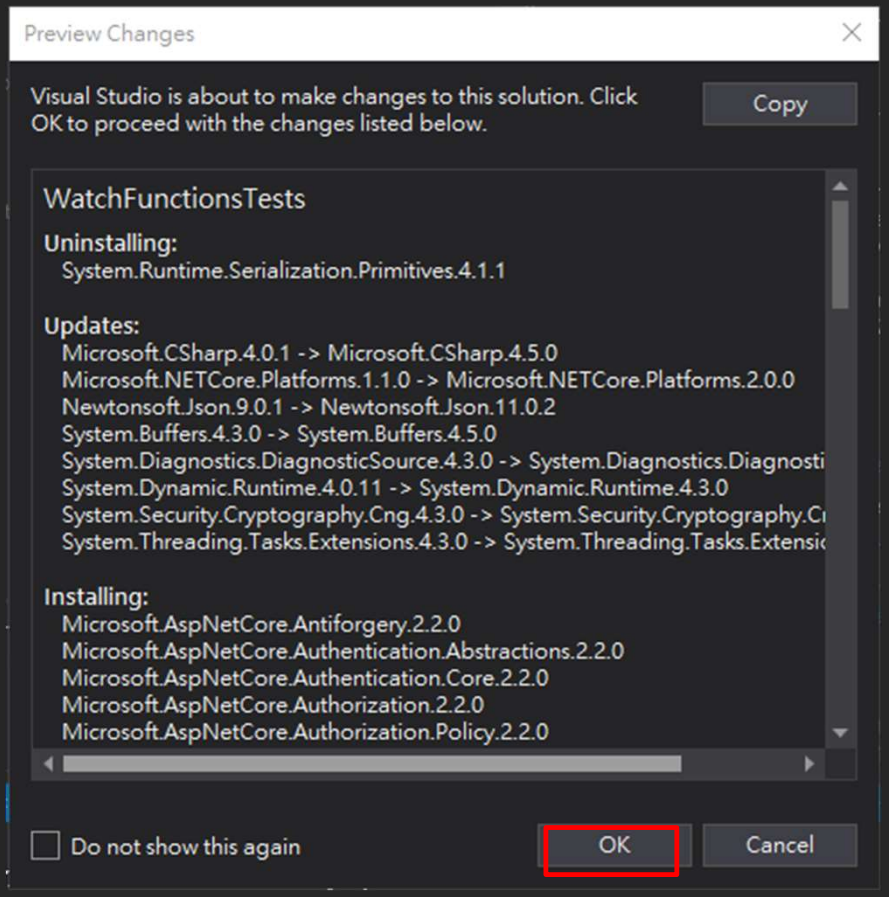
Unit test an Azure Function - 5

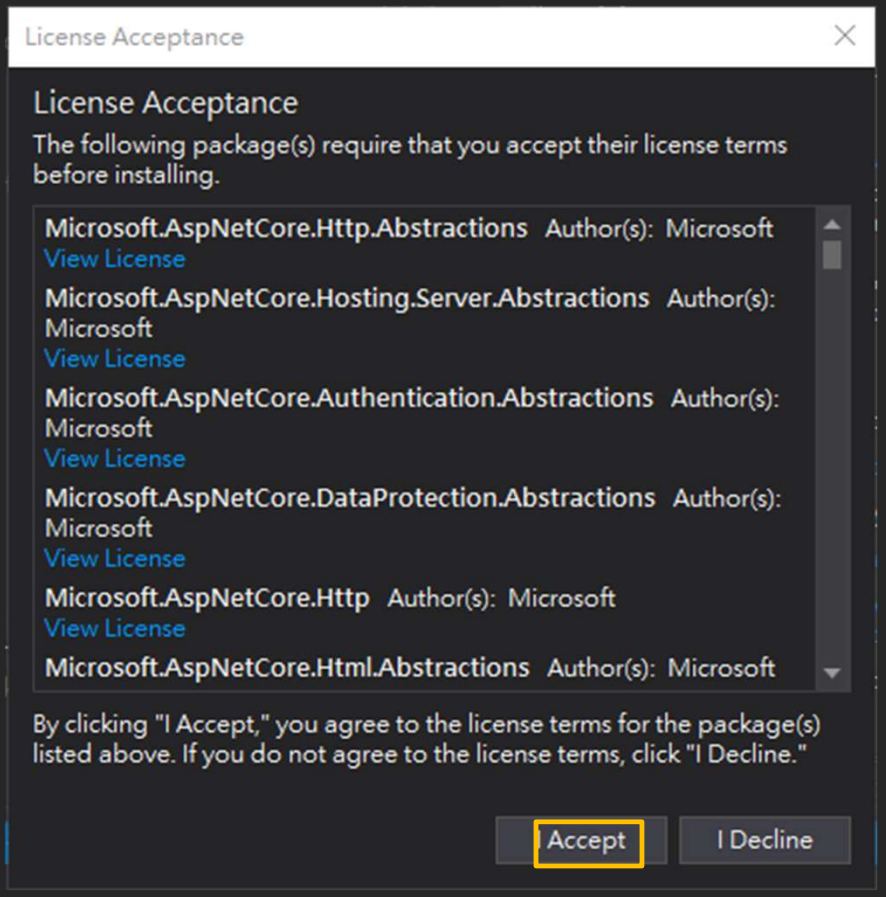


Unit test an Azure Function - 6

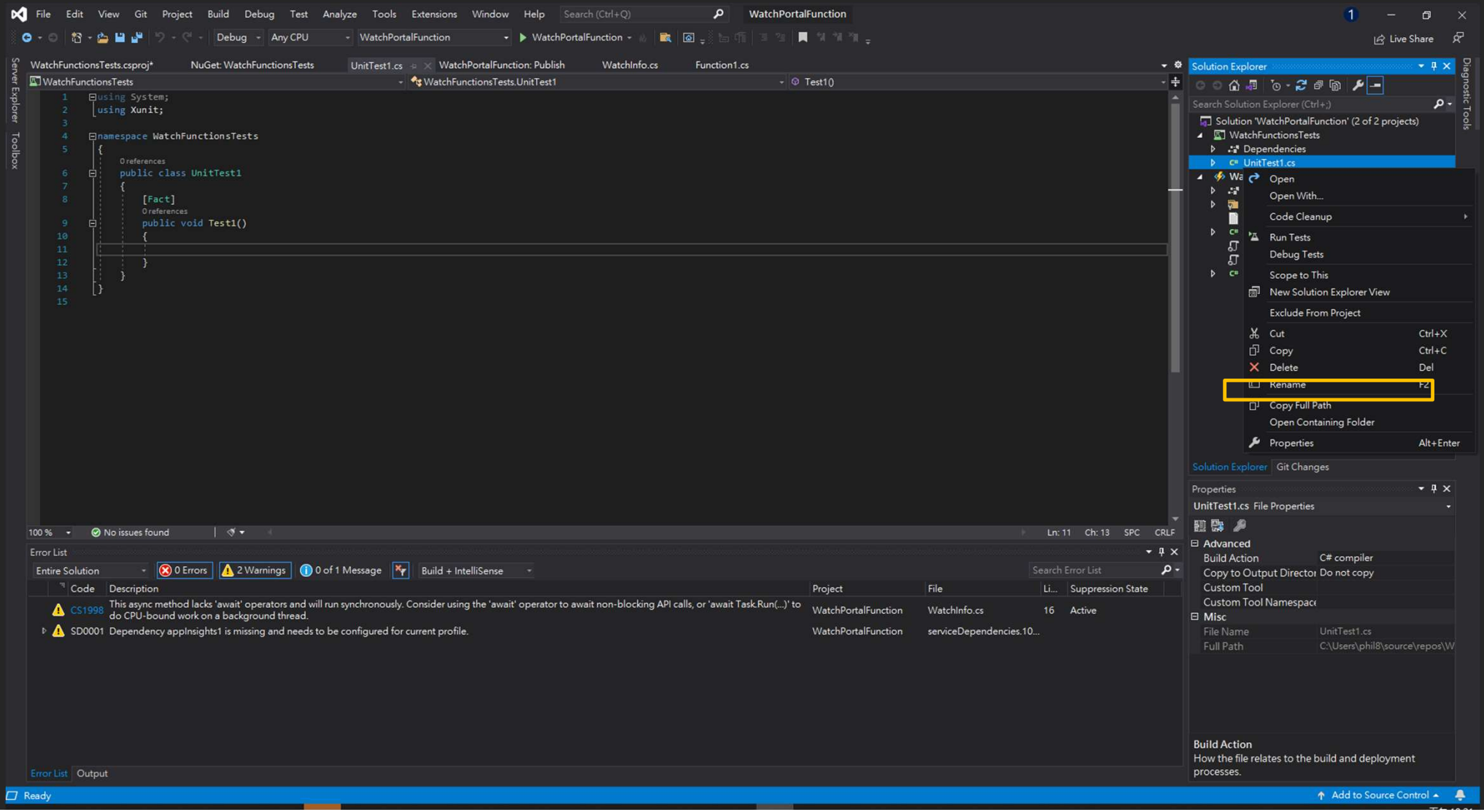


Unit test an Azure Function - 7

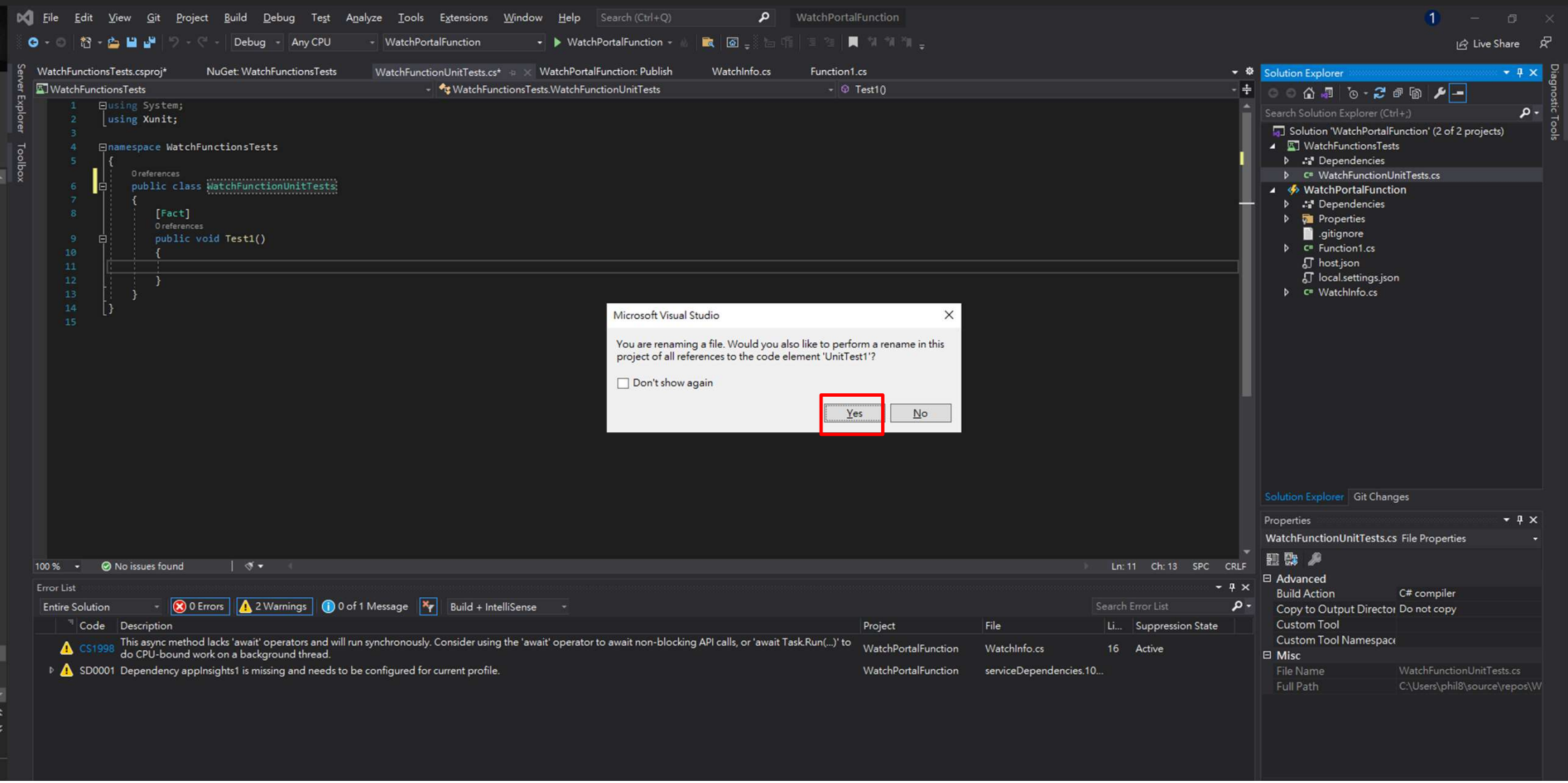




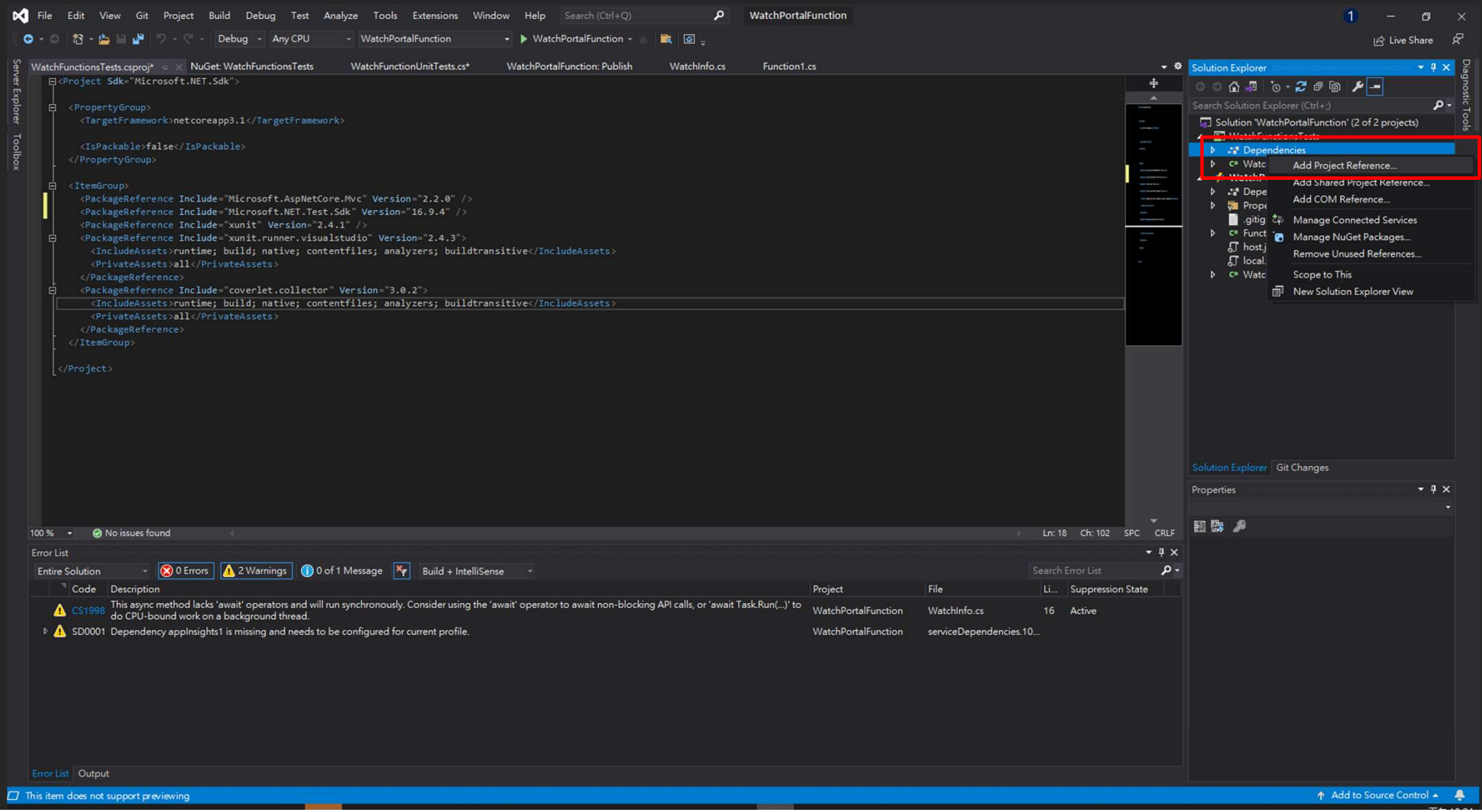
Unit test an Azure Function - 8



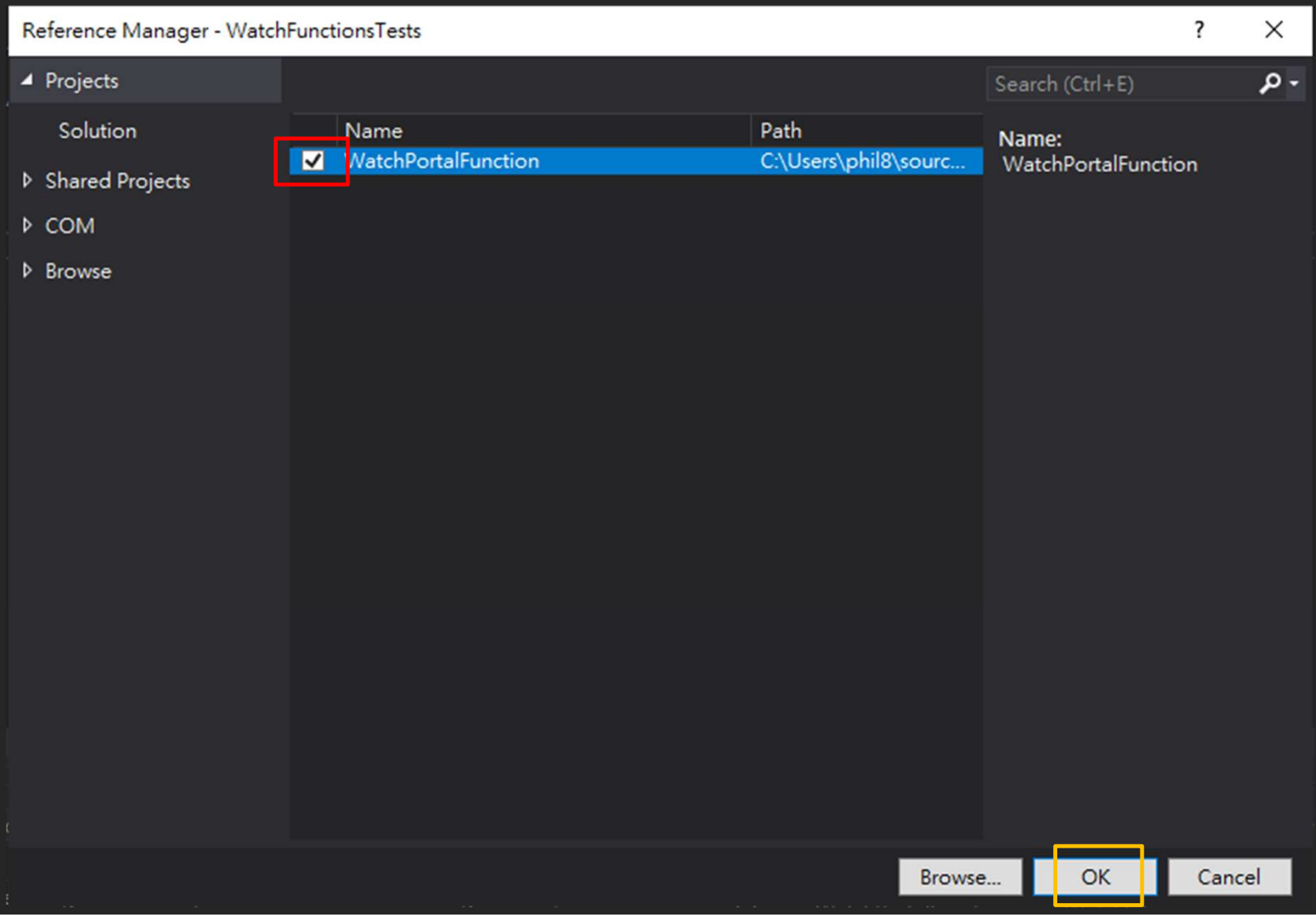
Unit test an Azure Function - 9



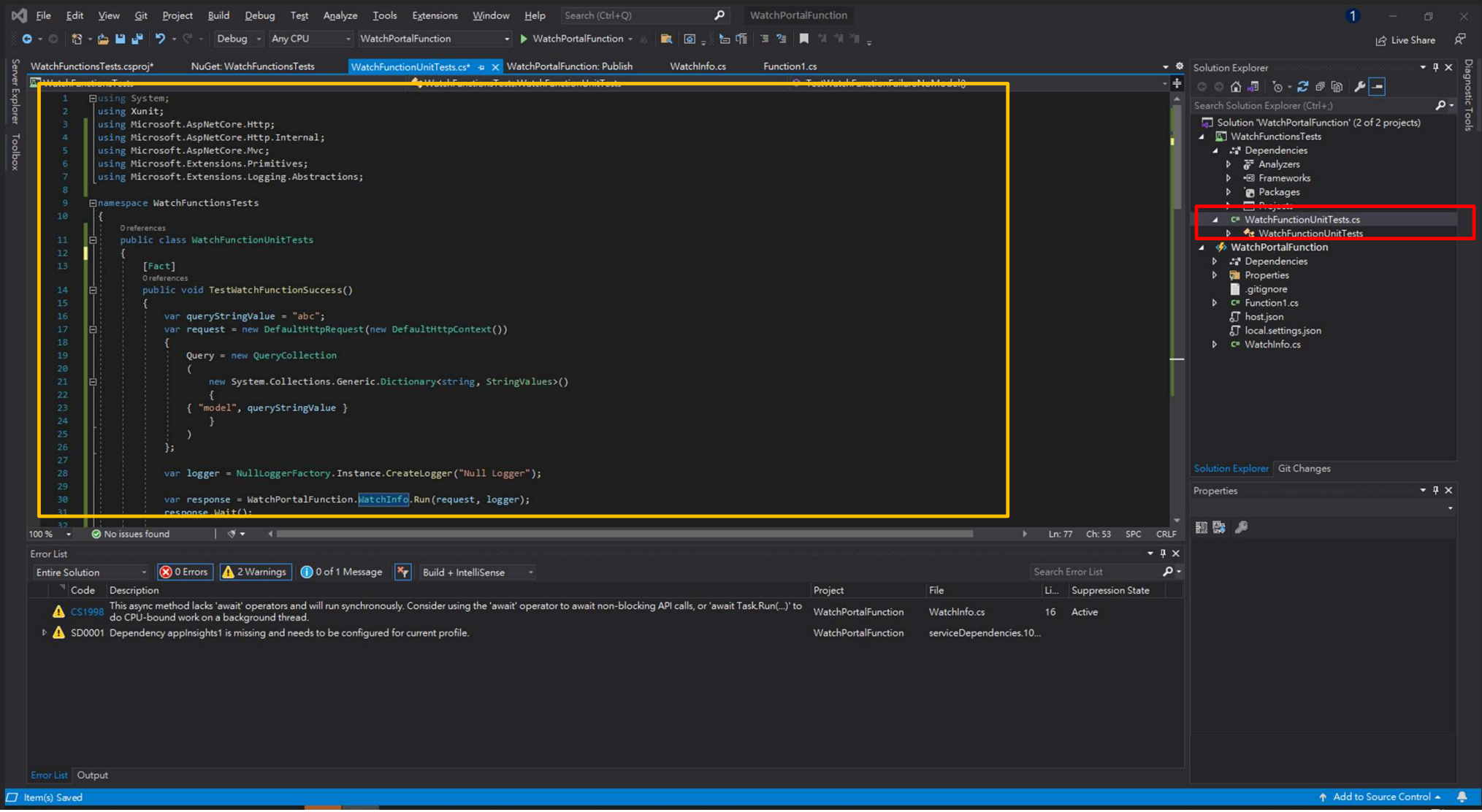
Unit test an Azure Function - 10



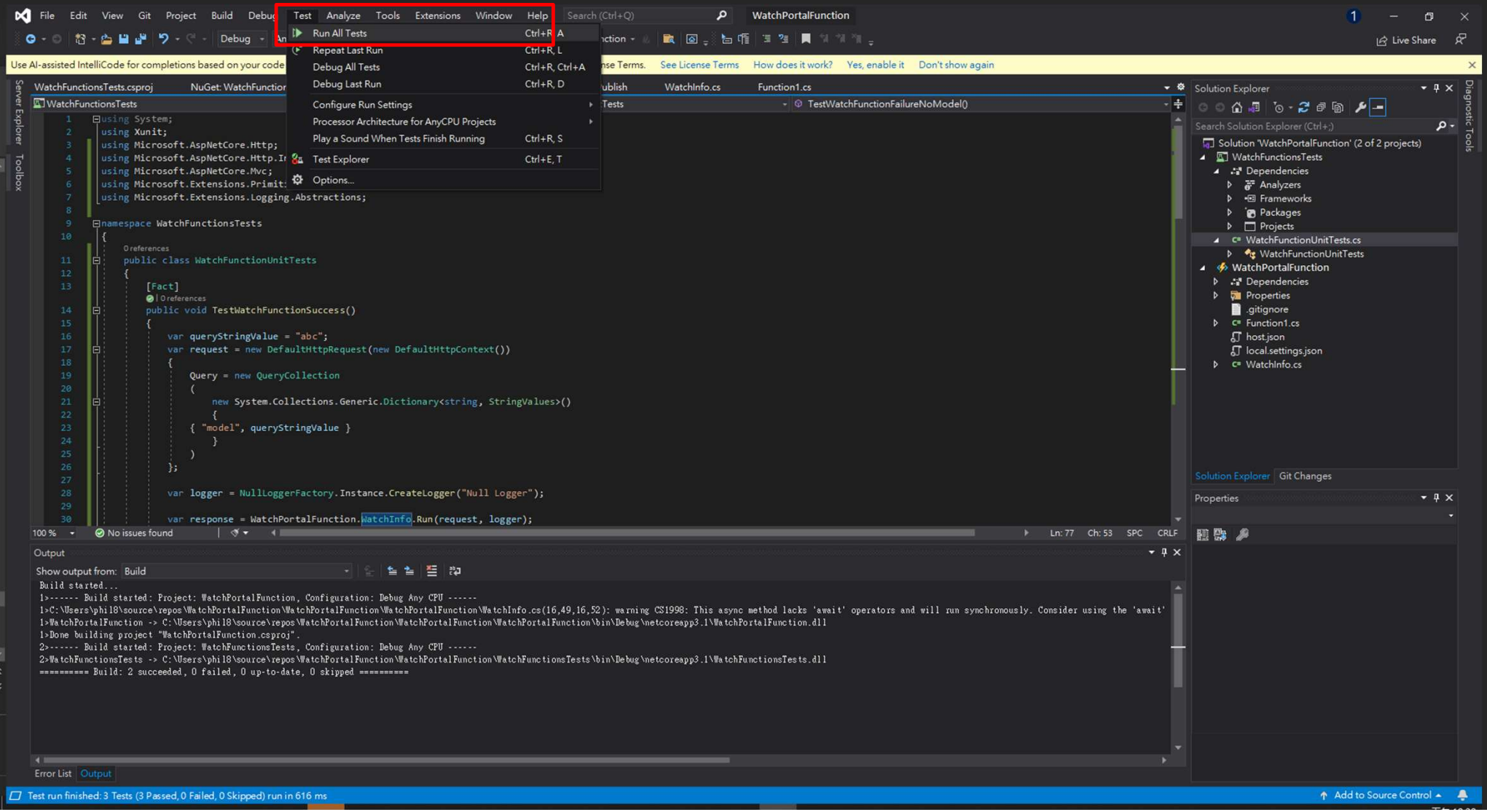
Unit test an Azure Function - 11



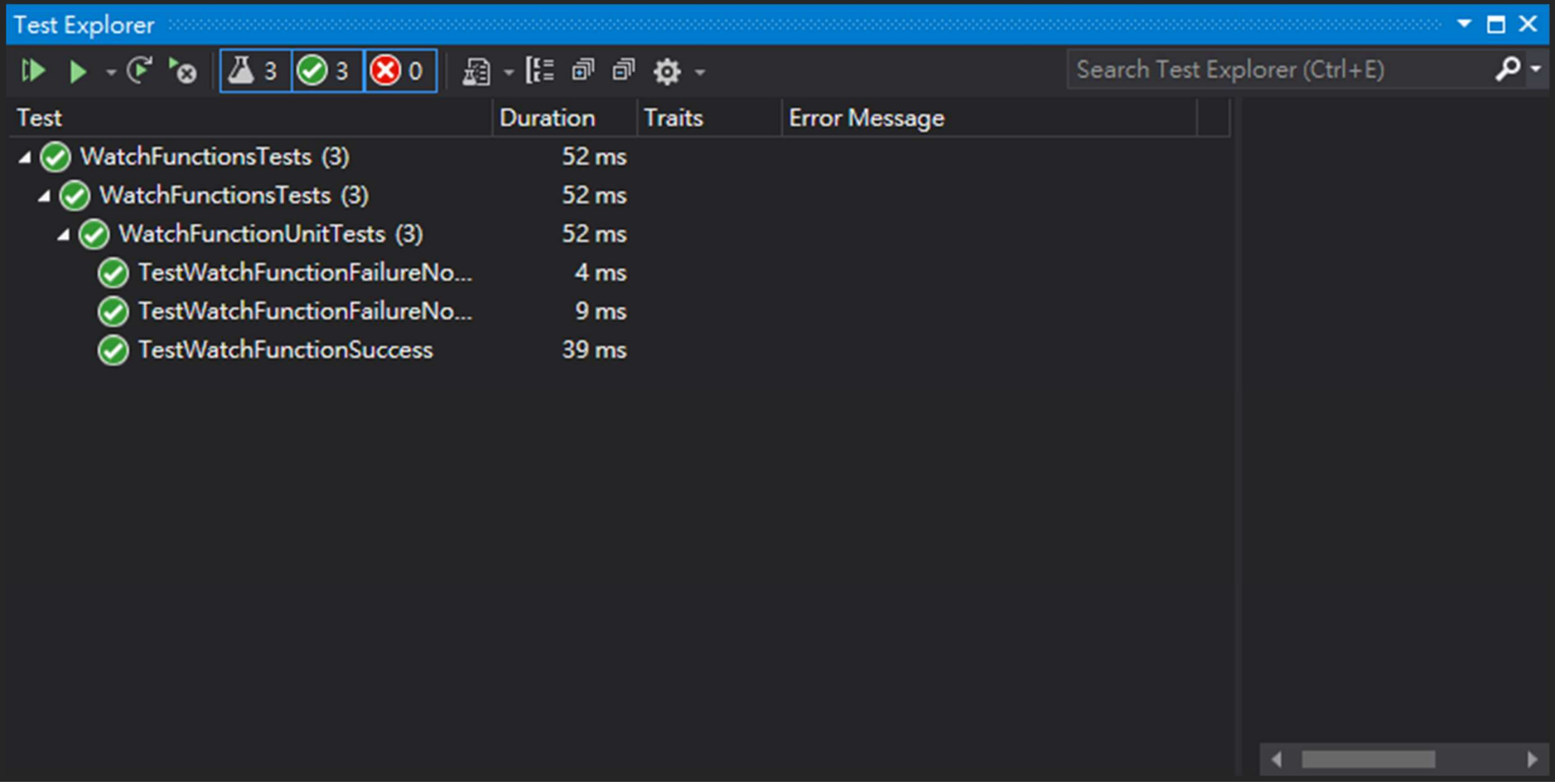
Unit test an Azure Function - 12



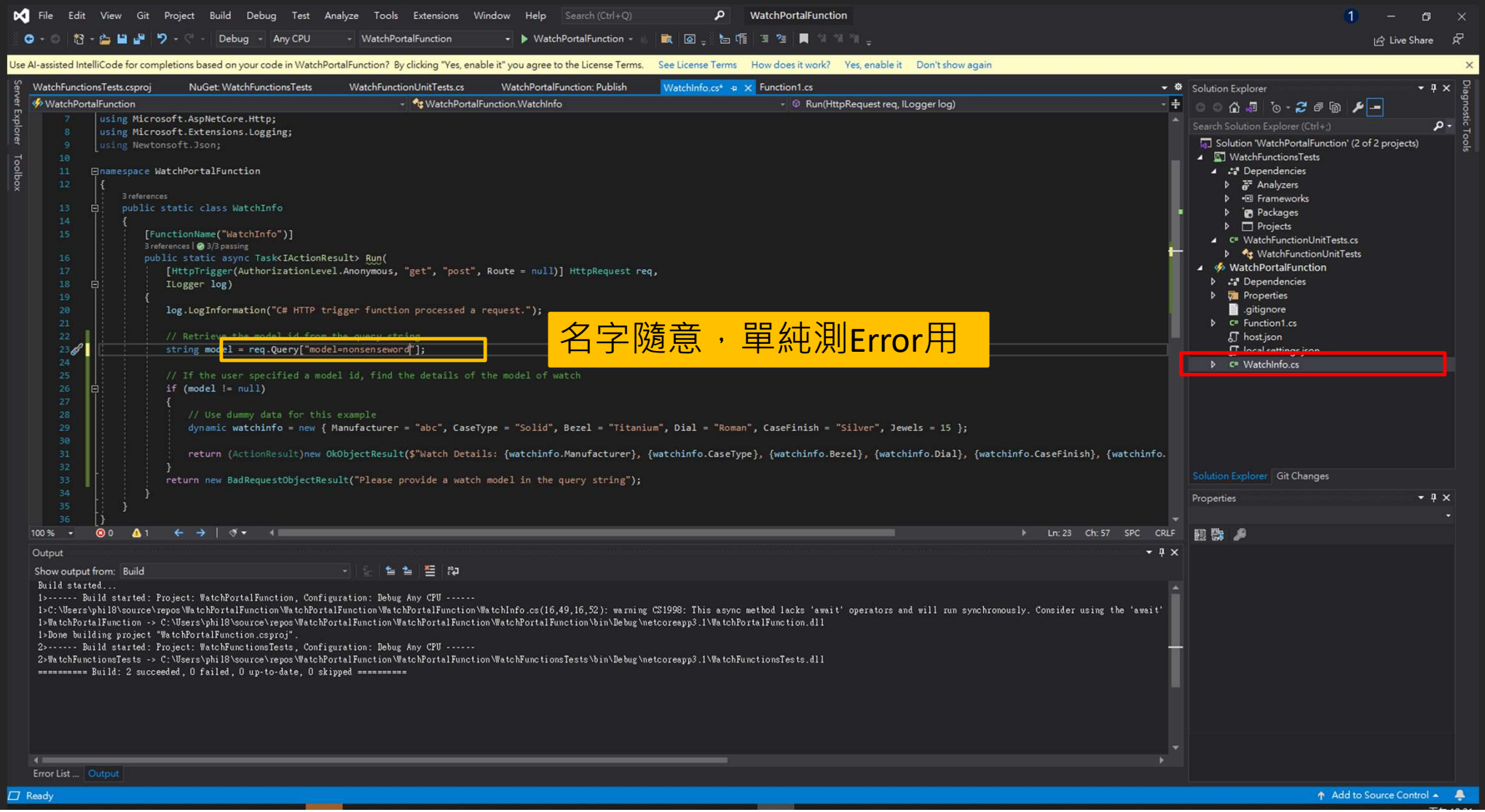
Unit test an Azure Function - 13



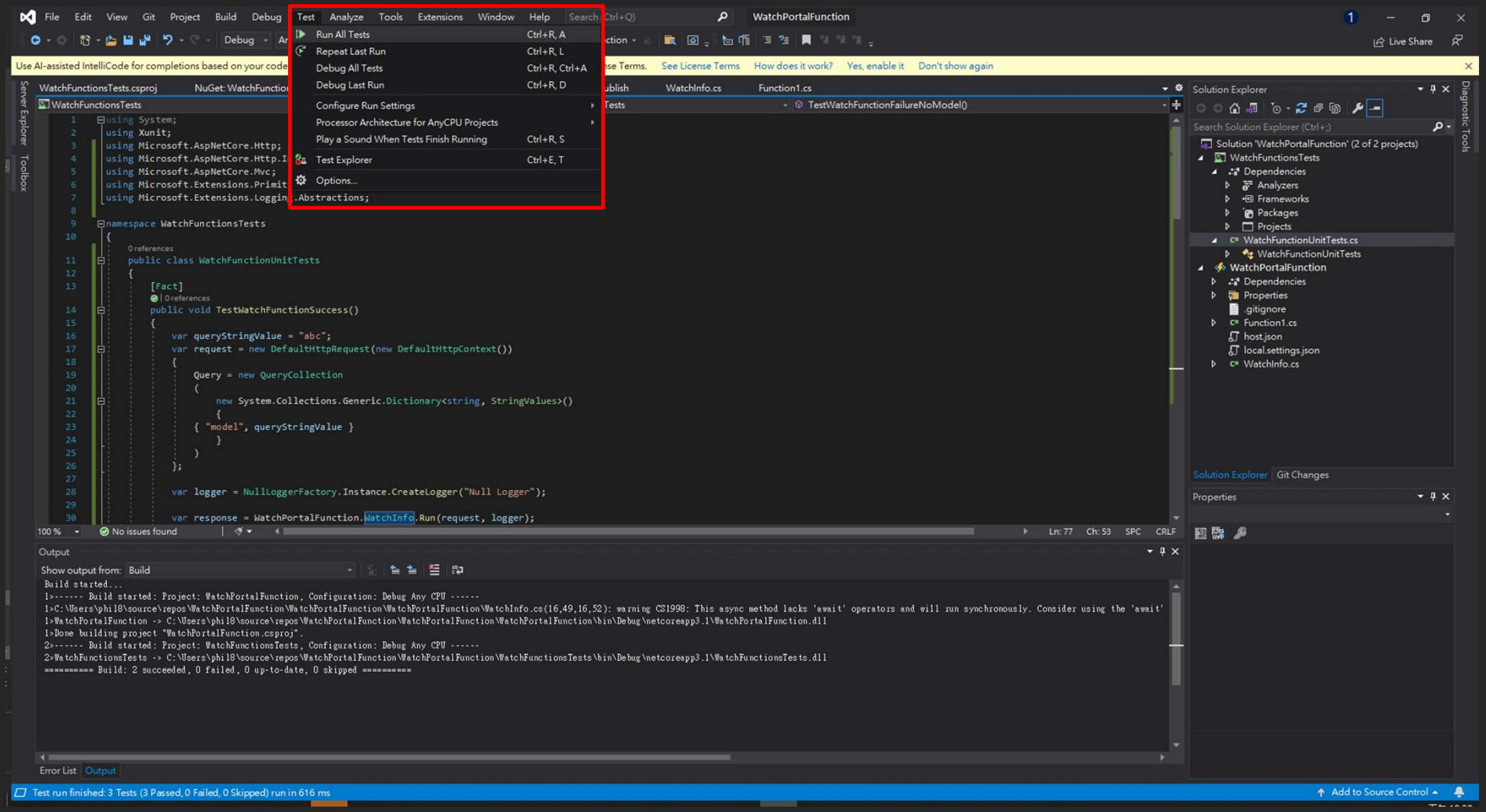
Unit test an Azure Function - 14



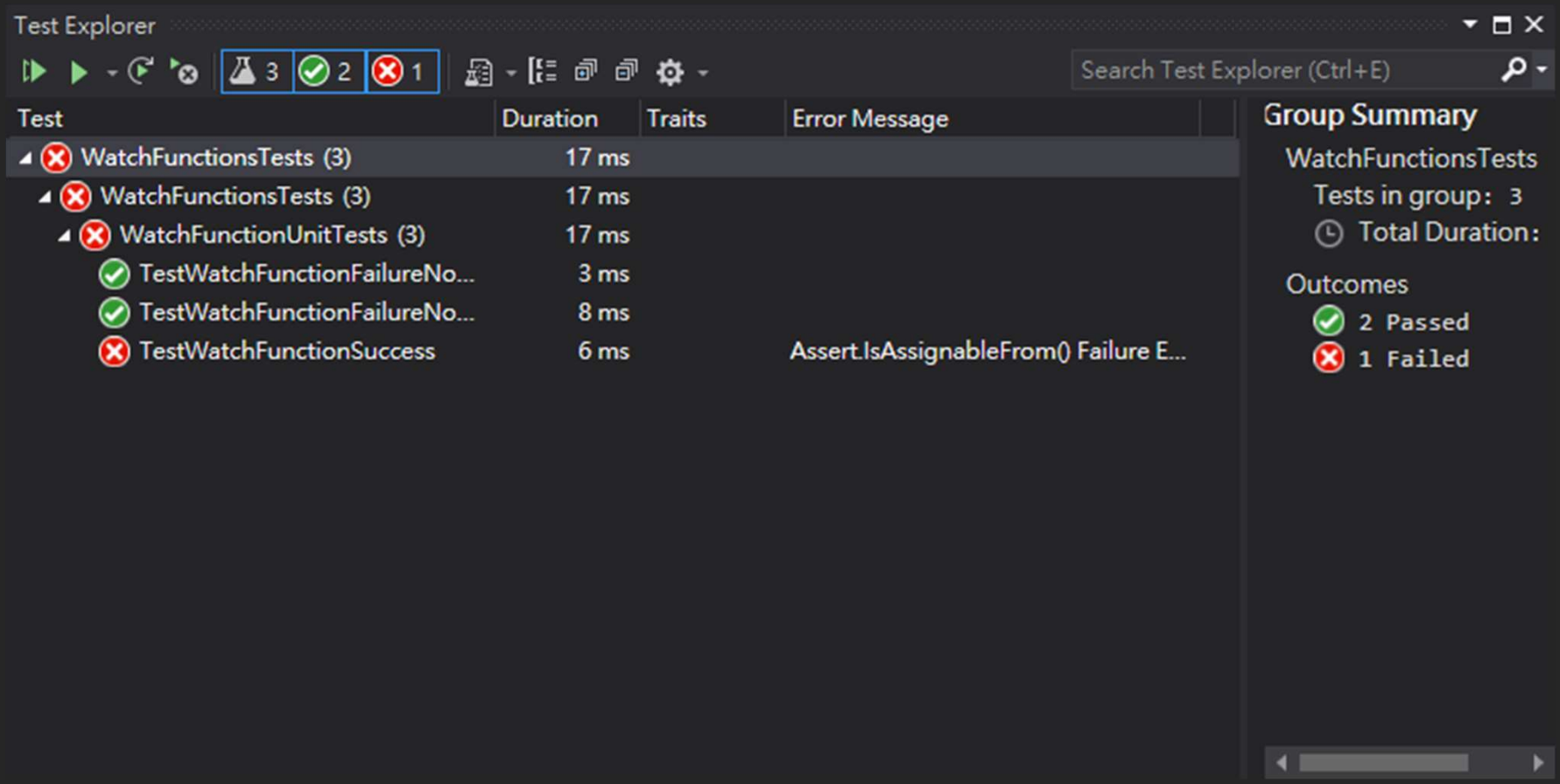
Unit test an Azure Function - 15



Unit test an Azure Function - 16



Unit test an Azure Function - 17



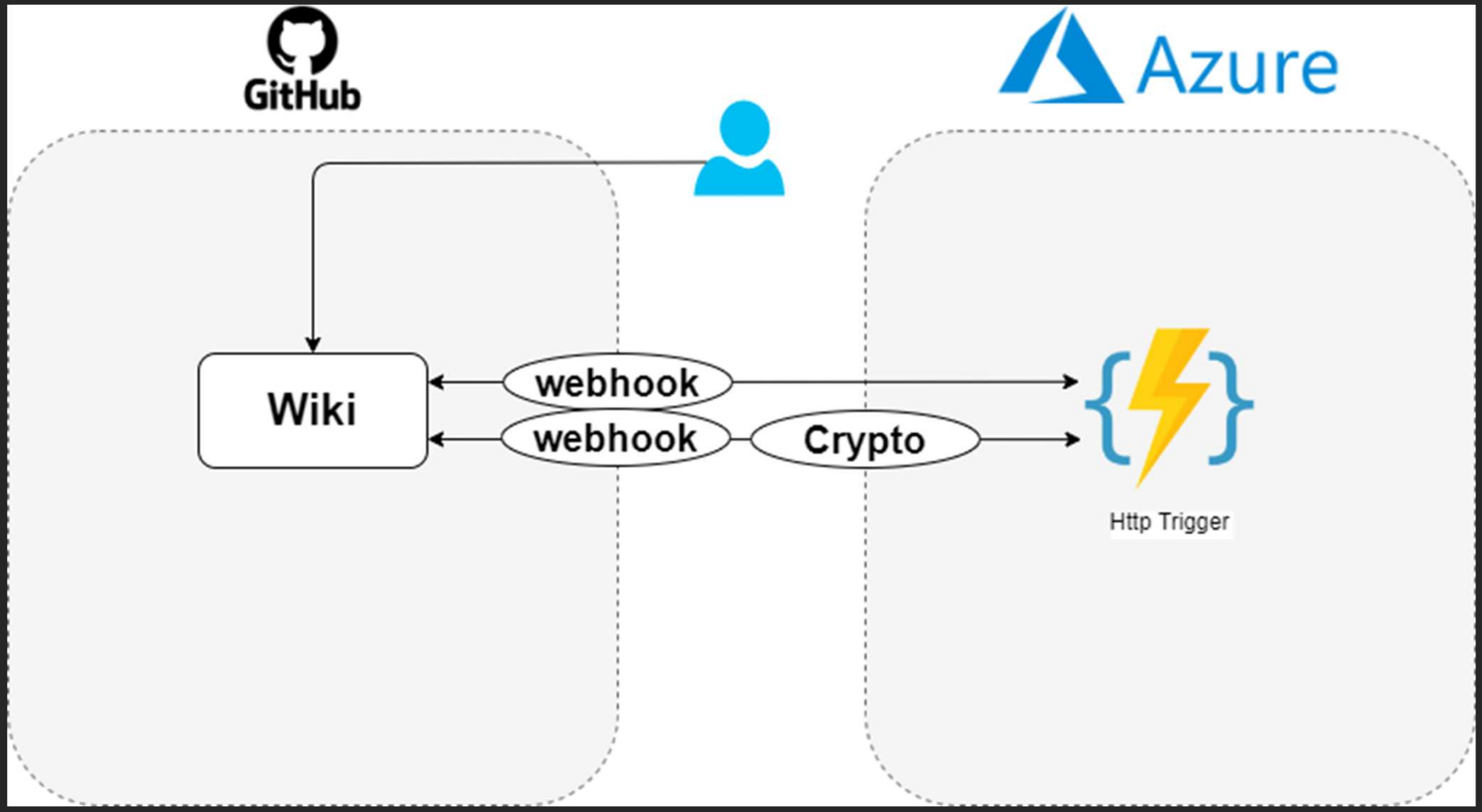
Resource Check

Remove Resource

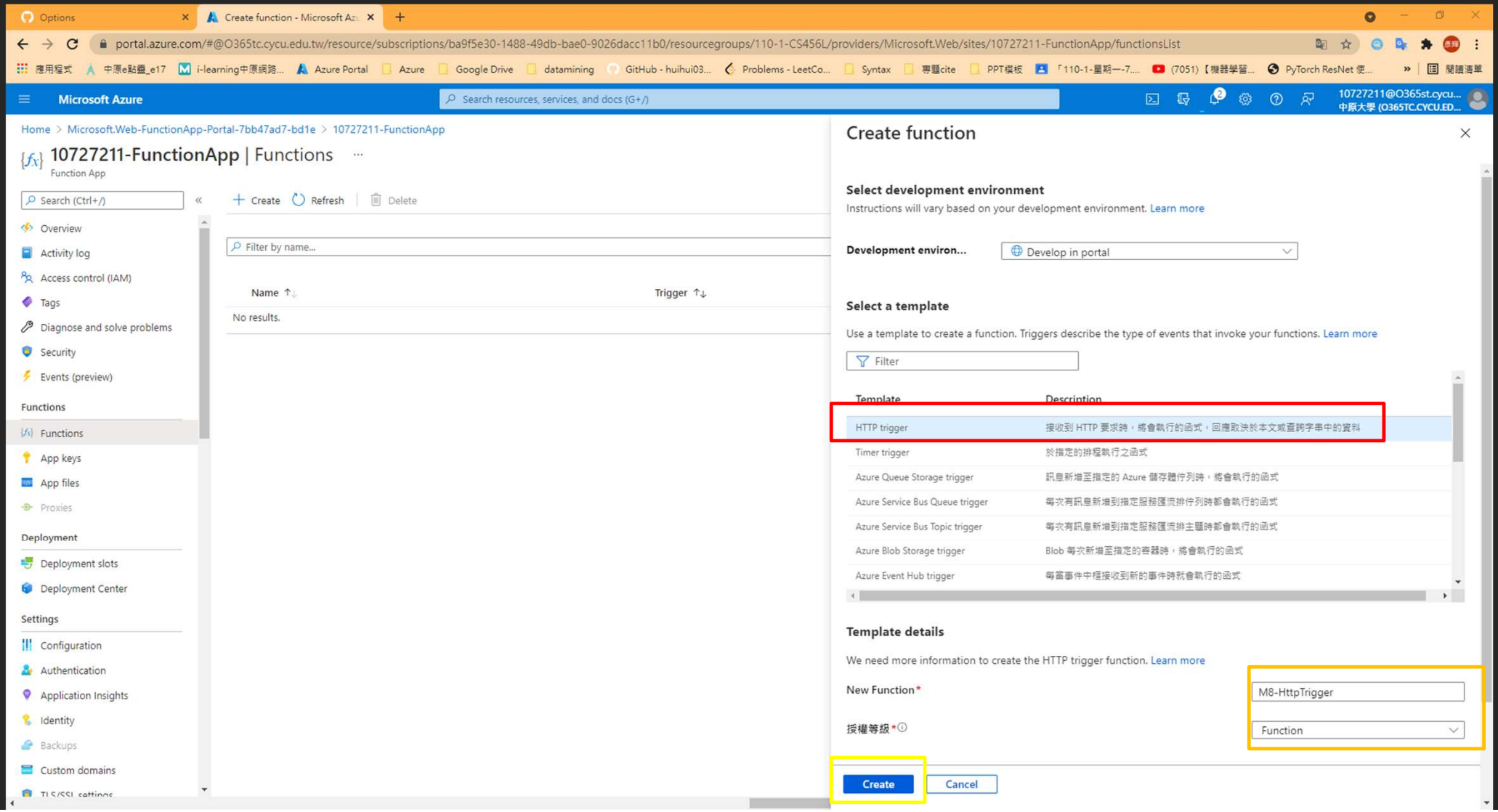
- cosmosdb
- functionapp

08 Monitor GitHub events by using a webhook with Azure Functions

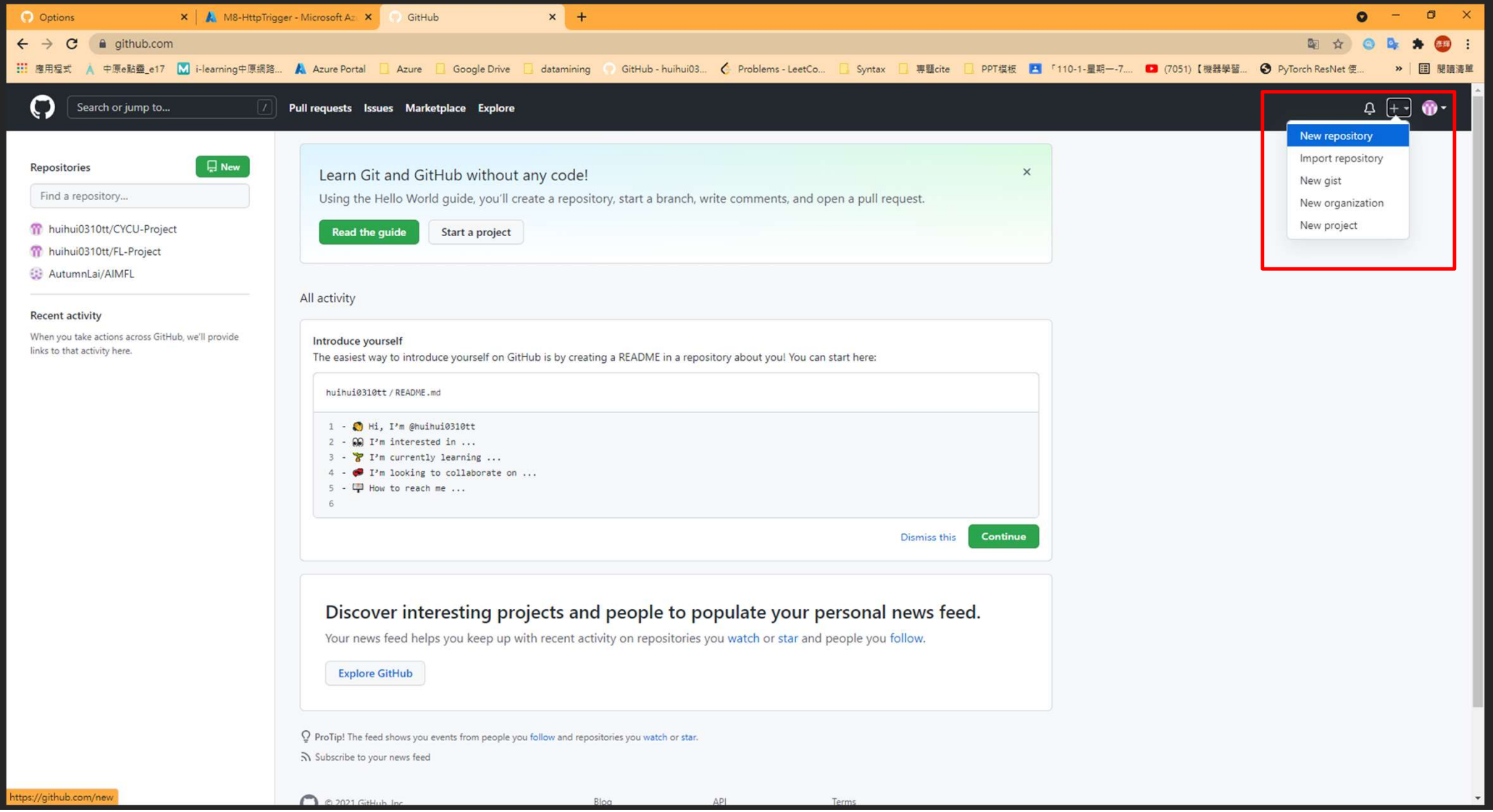
Abstract



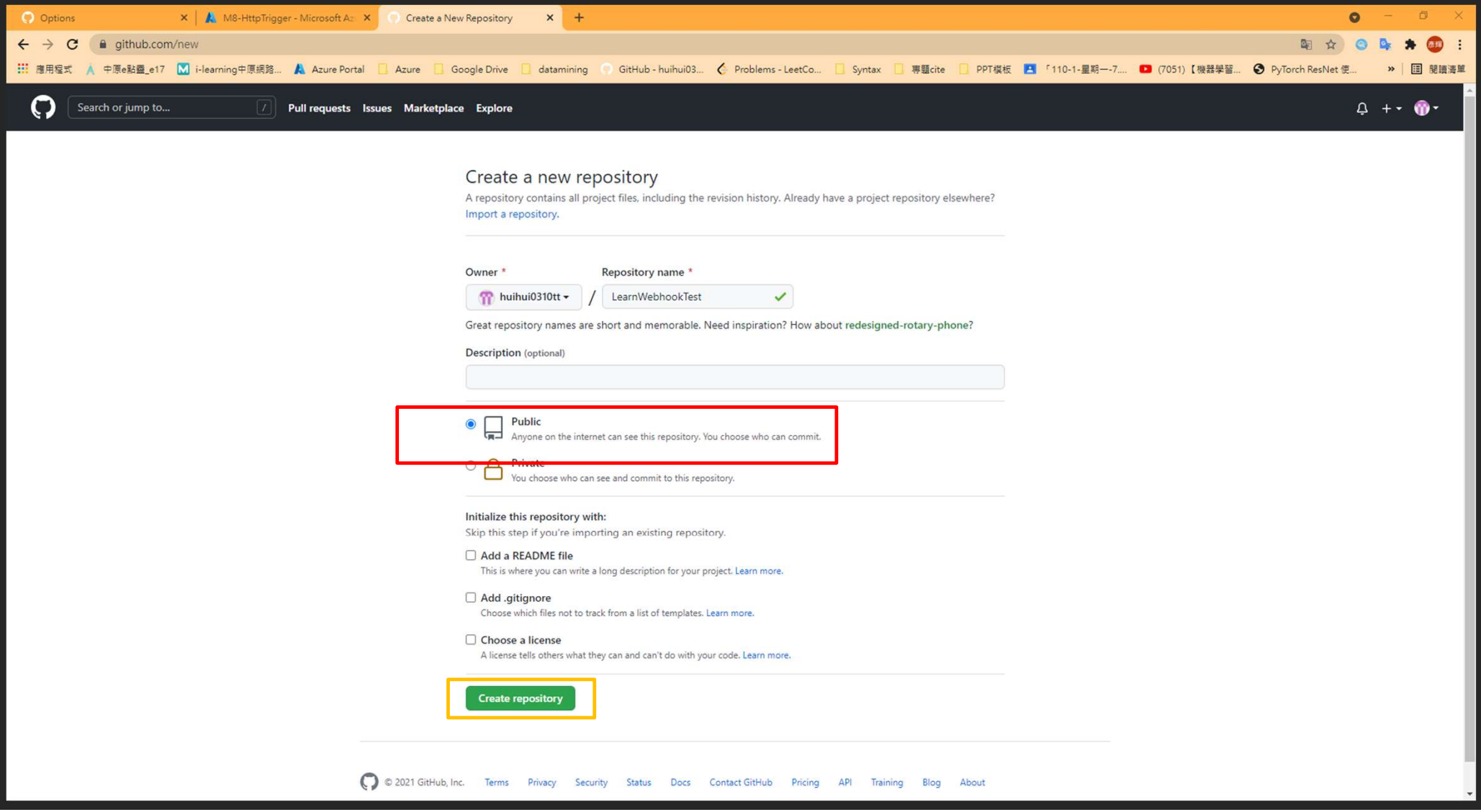
Create a webhook triggered function



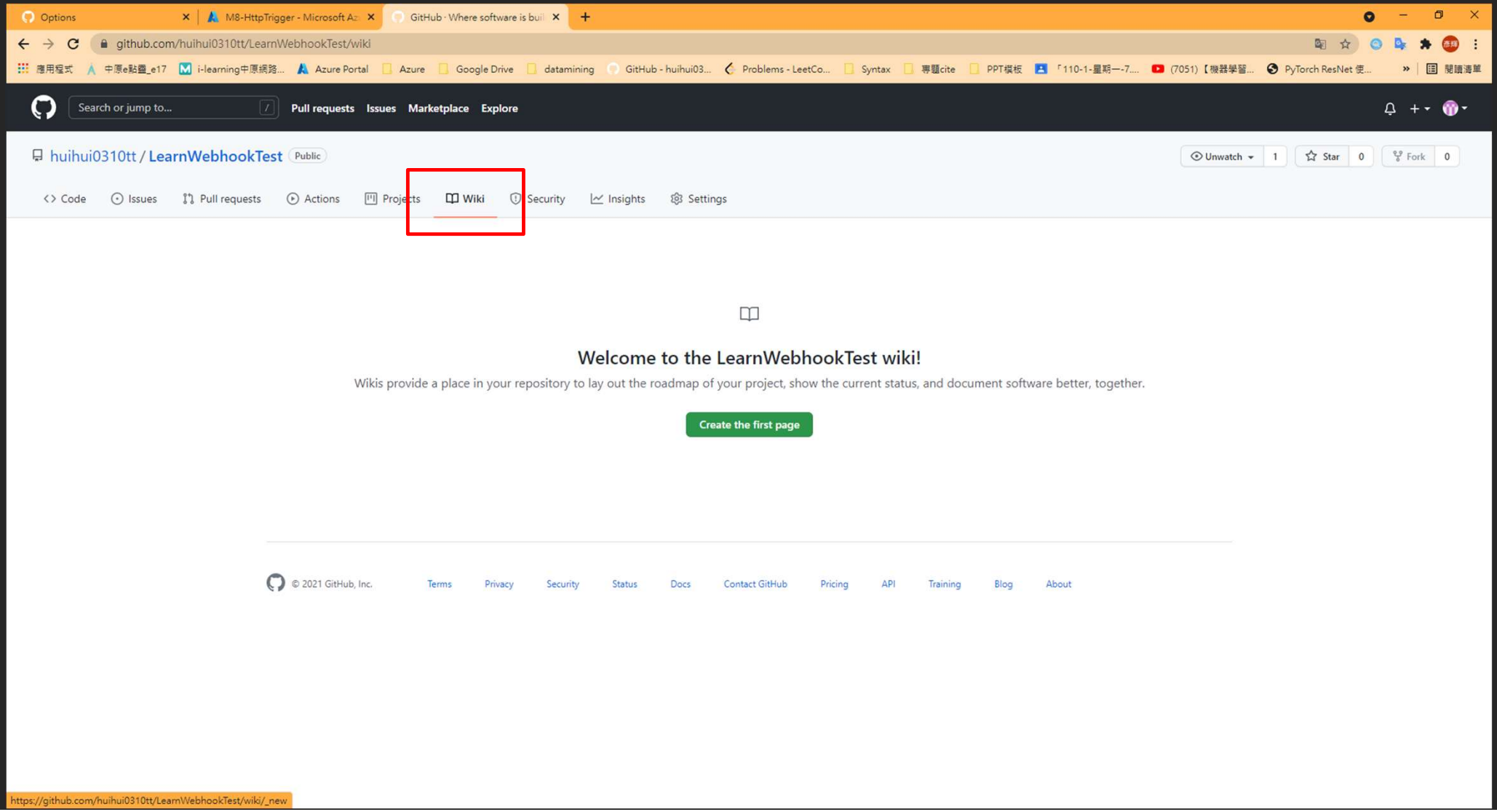
Set up a webhook for a GitHub repository - 1



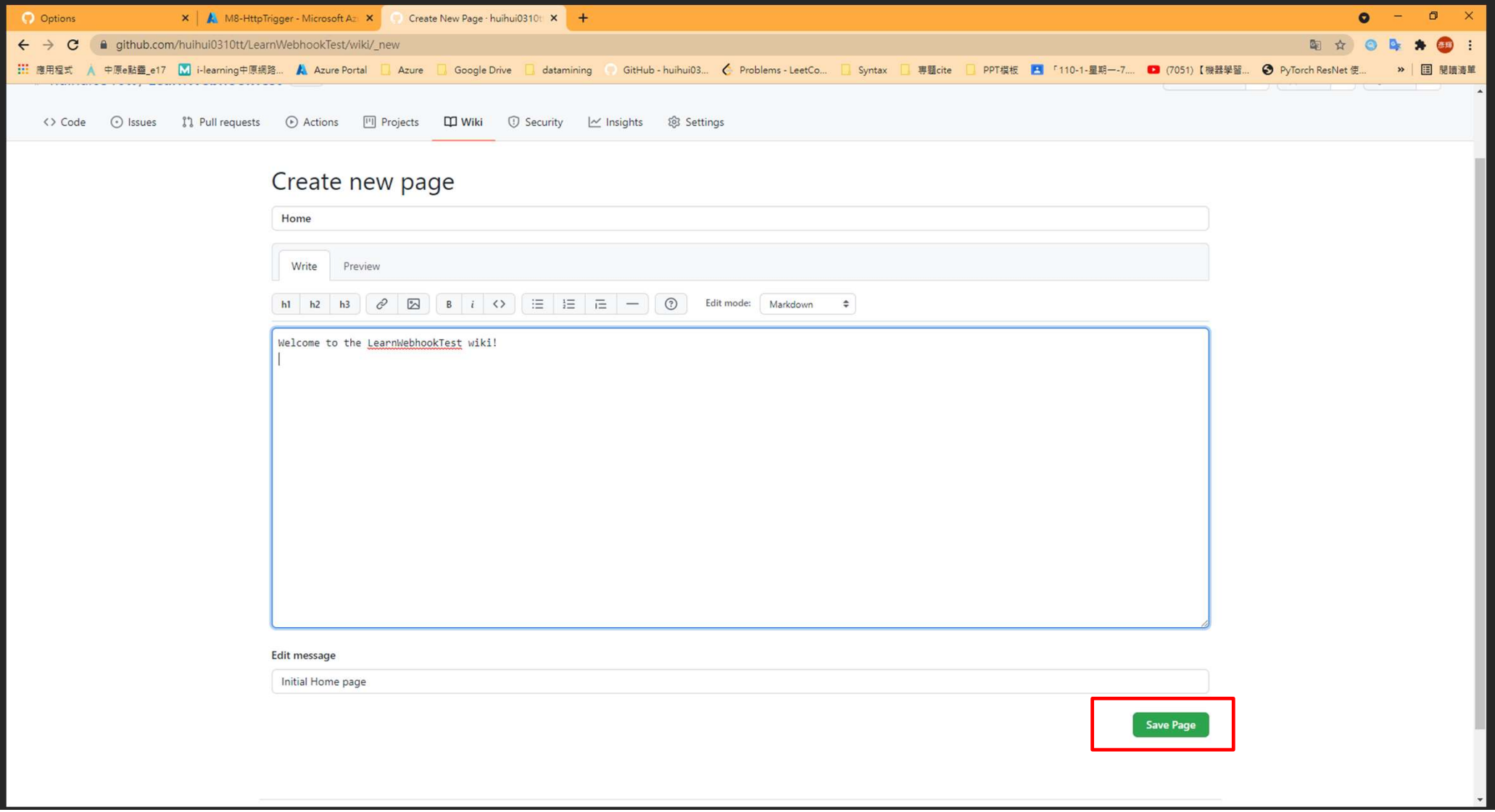
Set up a webhook for a GitHub repository - 2



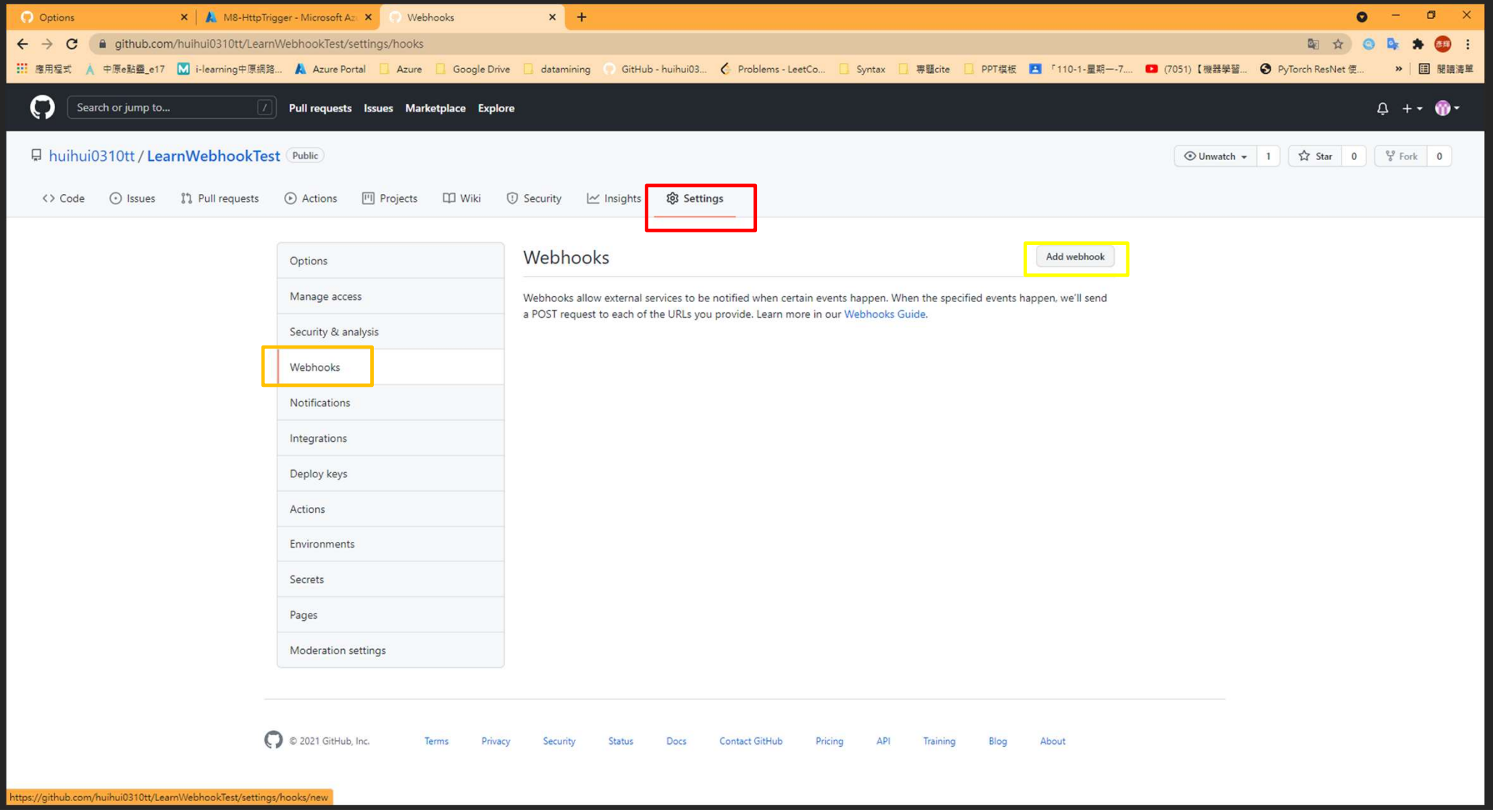
Add a webhook for the Gollum event - 1



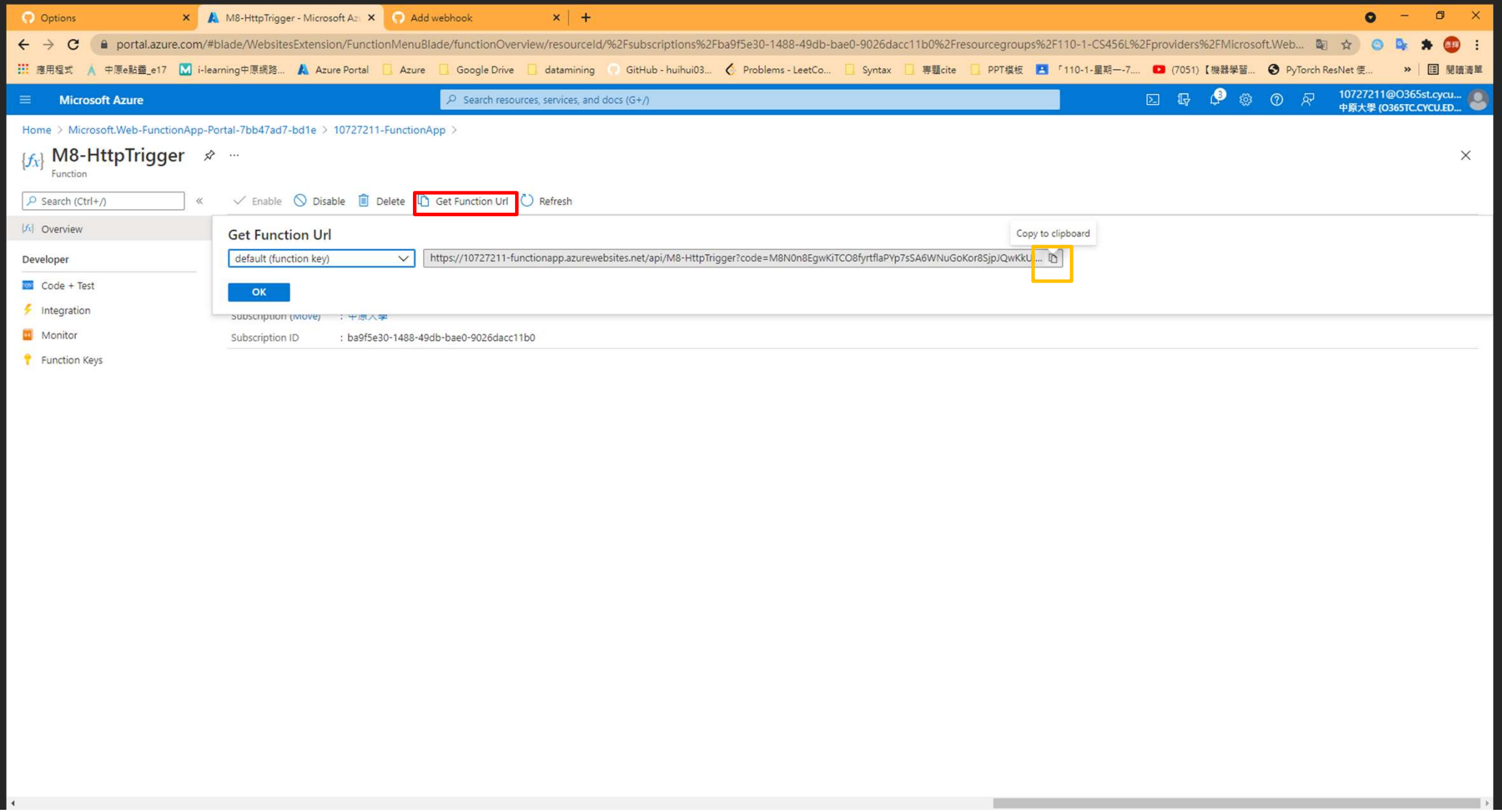
Add a webhook for the Gollum event - 2



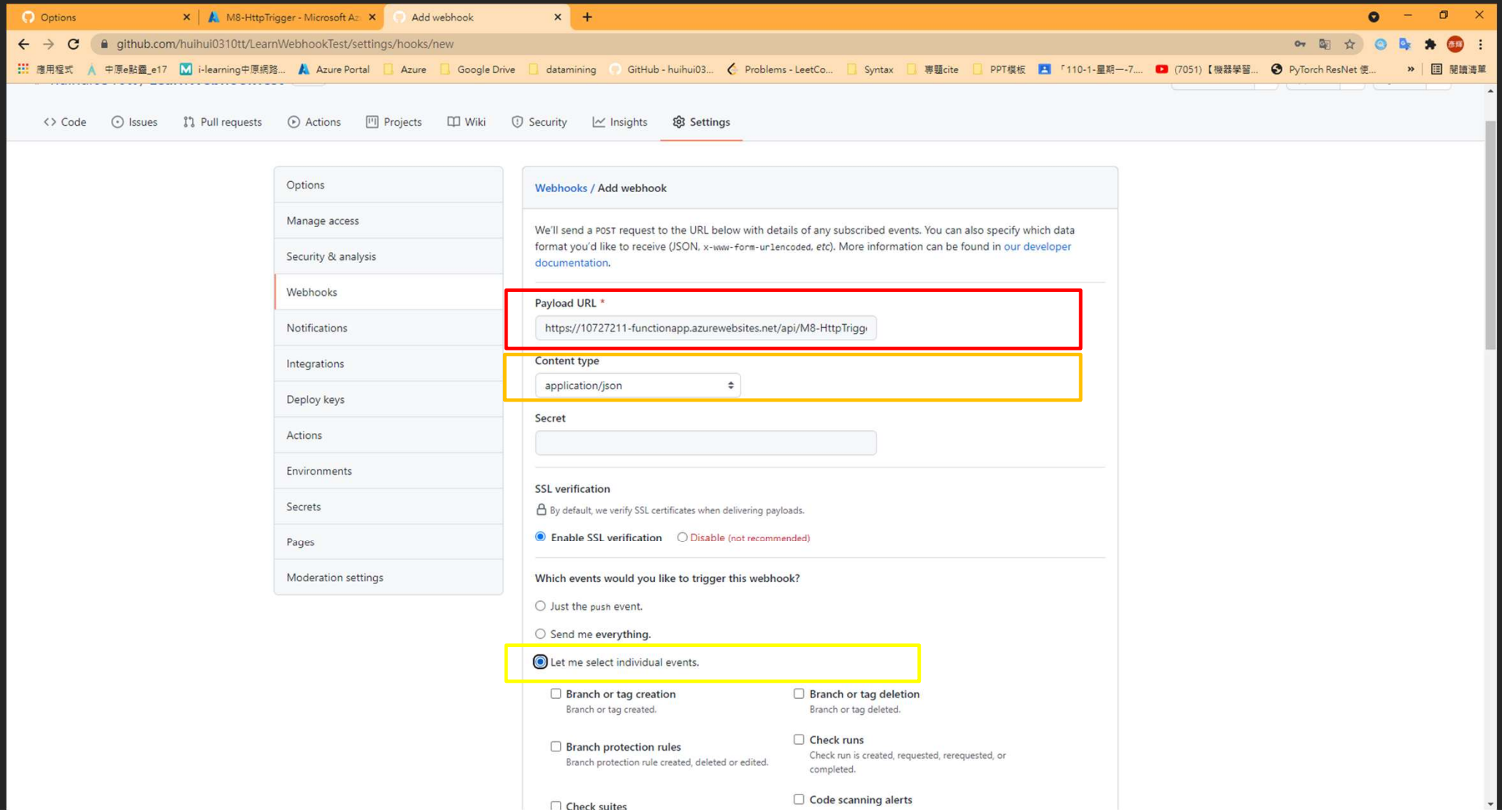
Add a webhook for the Gollum event - 3



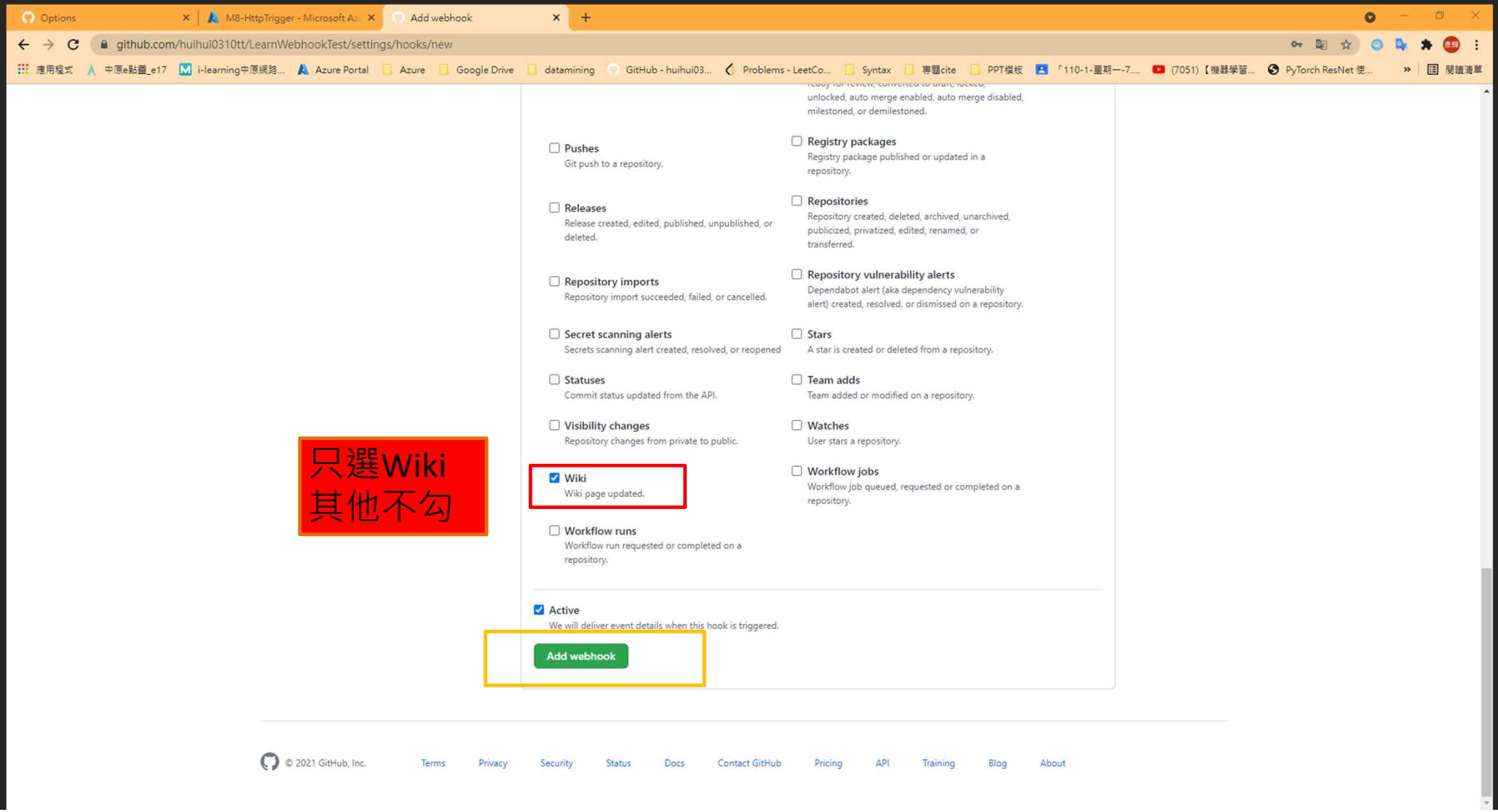
Add a webhook for the Gollum event - 4



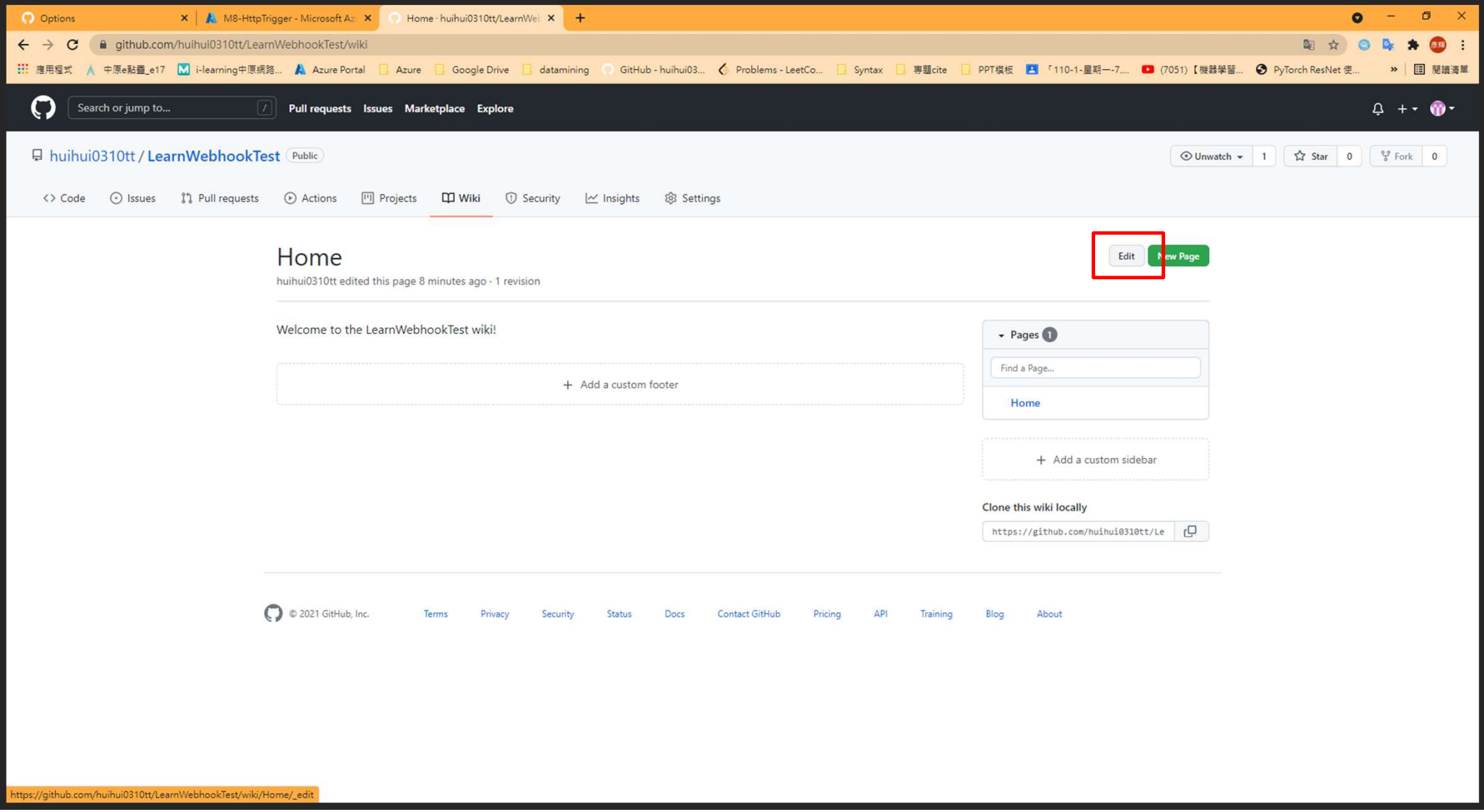
Add a webhook for the Gollum event - 5



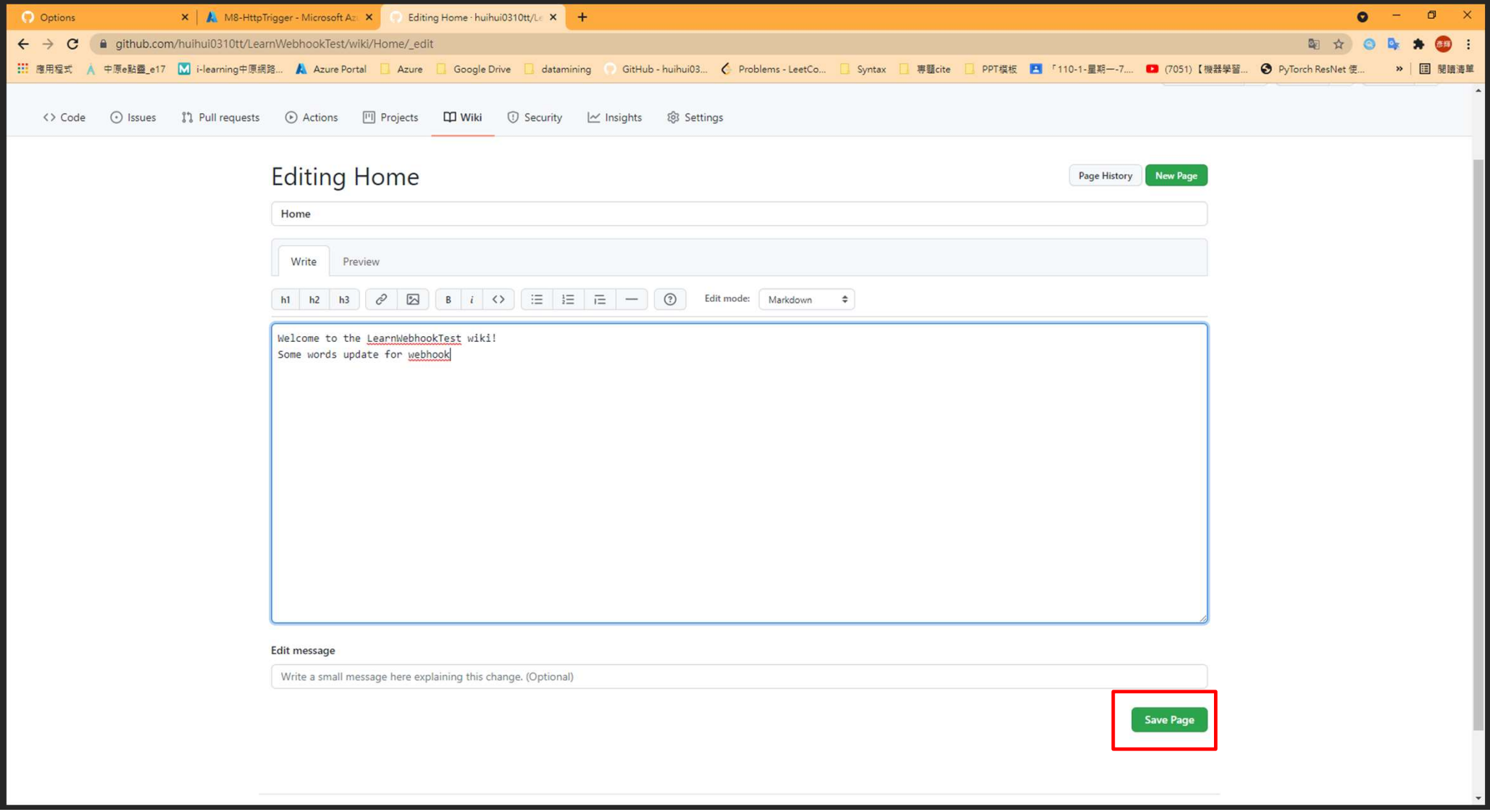
Add a webhook for the Gollum event - 6



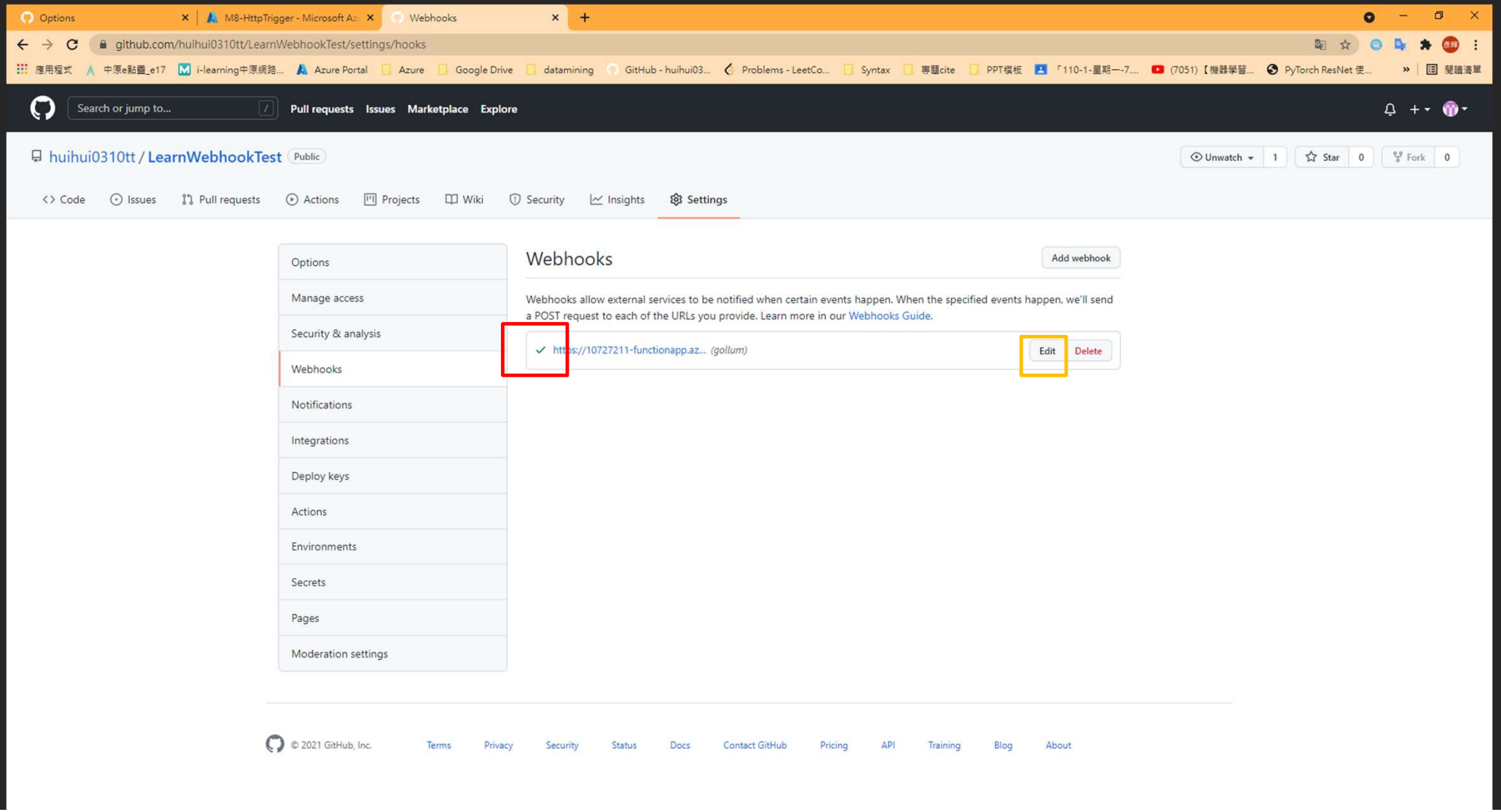
Test the webhook - 1



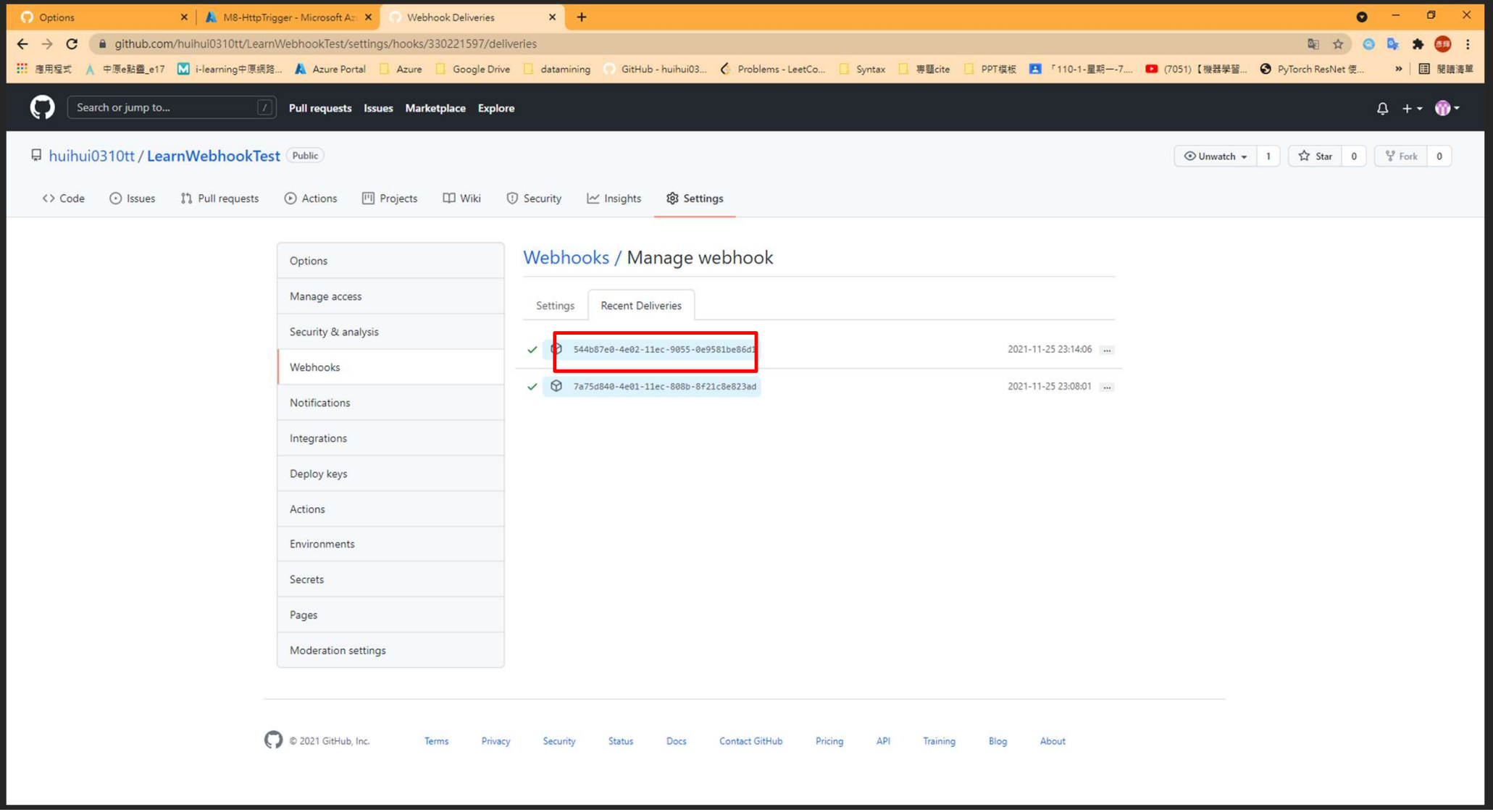
Test the webhook - 2



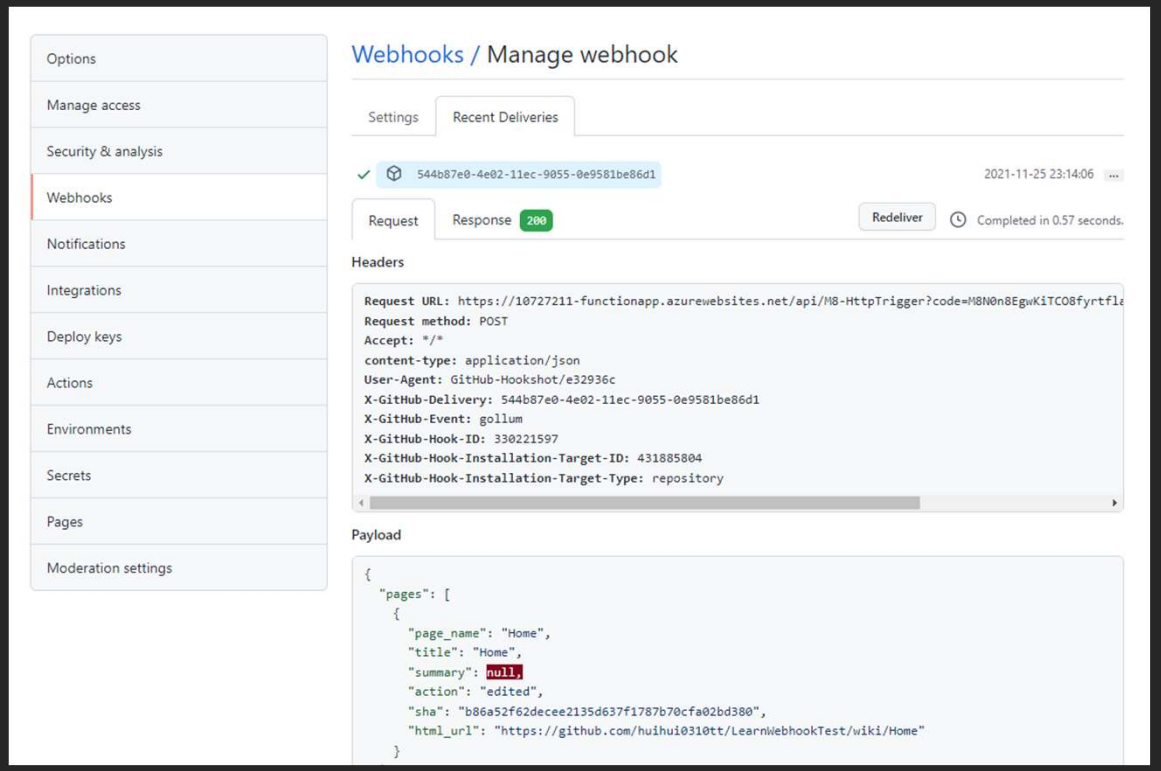
Test the webhook - 3

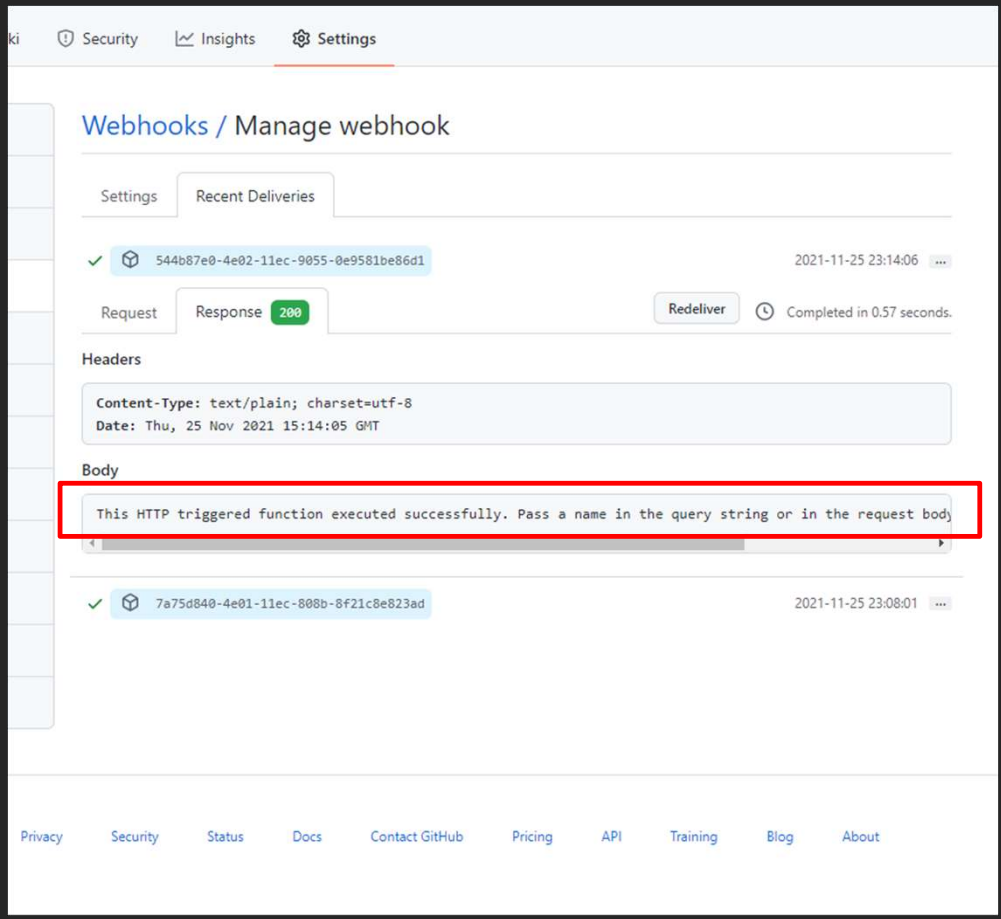


Test the webhook - 4

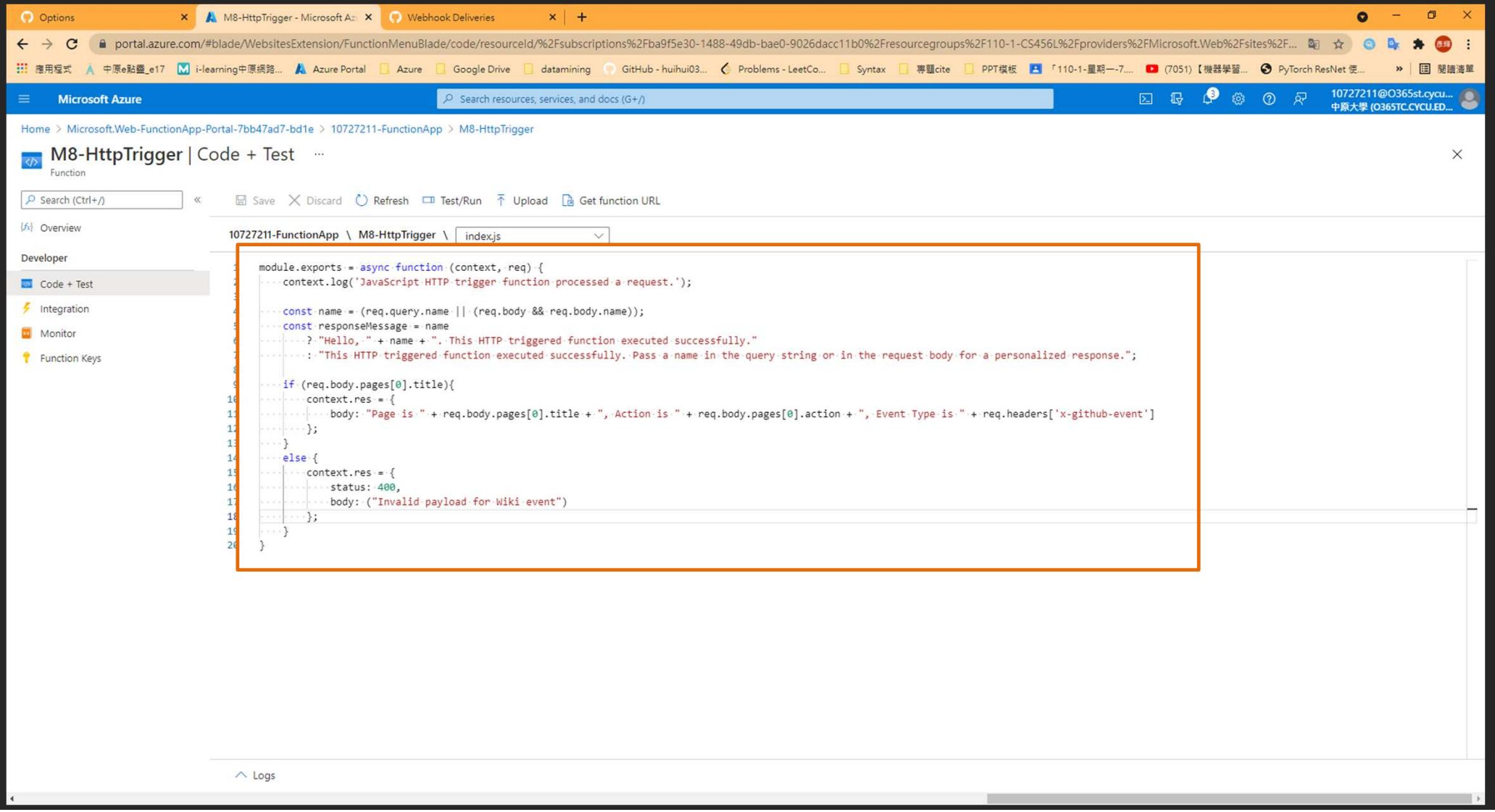


Test the webhook - 5

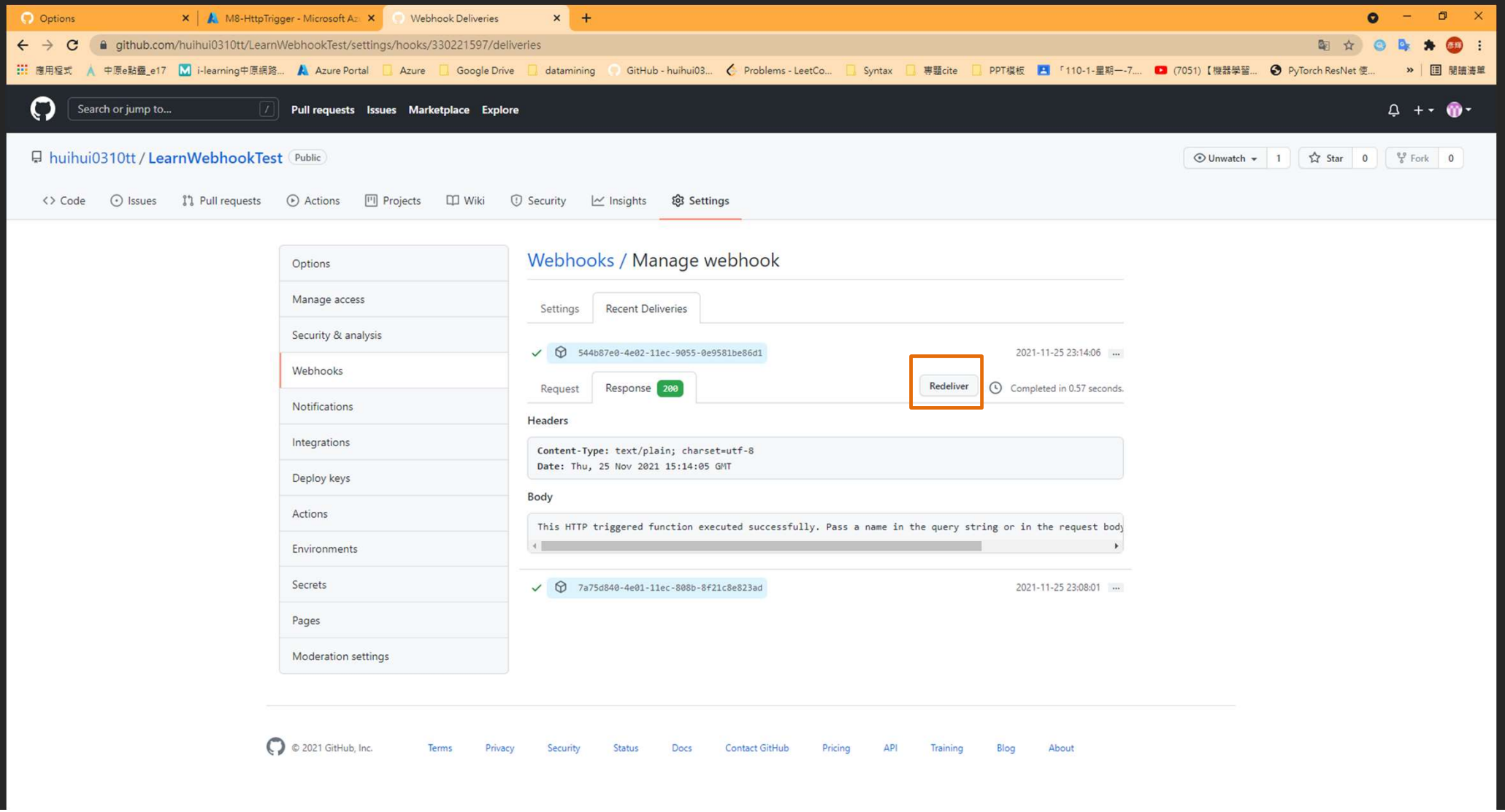




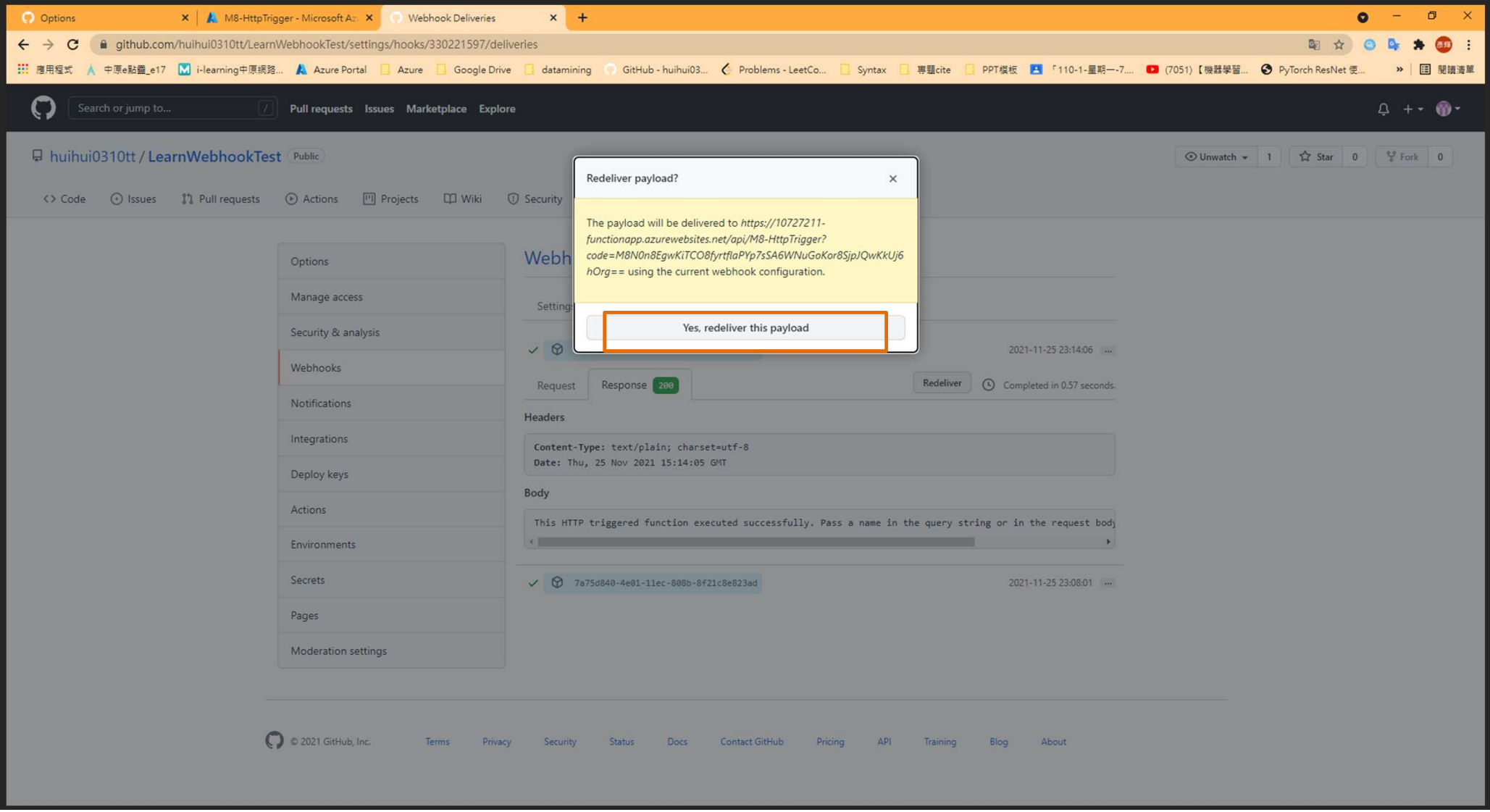
Exercise - Trigger an Azure Function with a GitHub event - 1



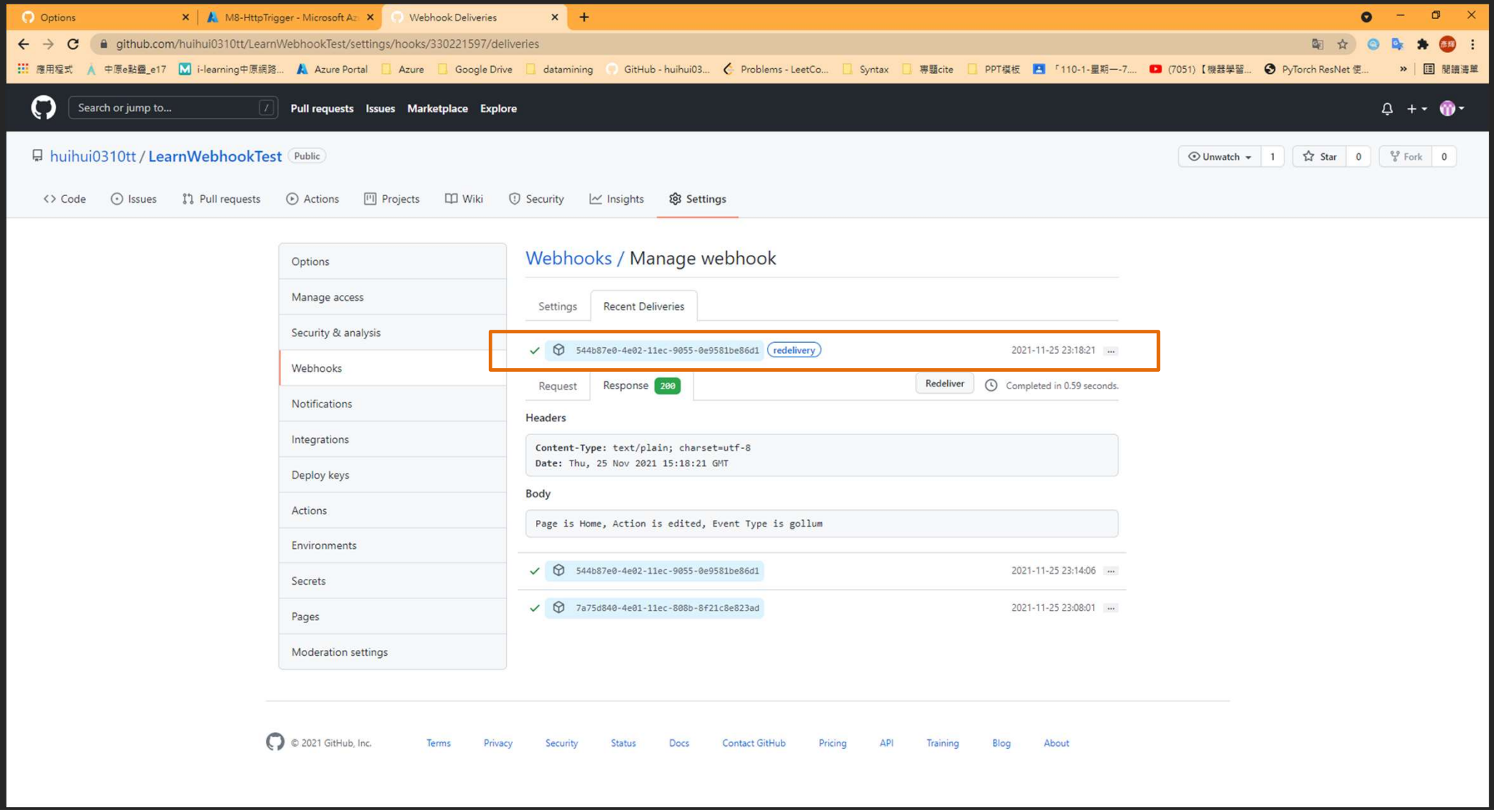
Exercise - Trigger an Azure Function with a GitHub event - 2



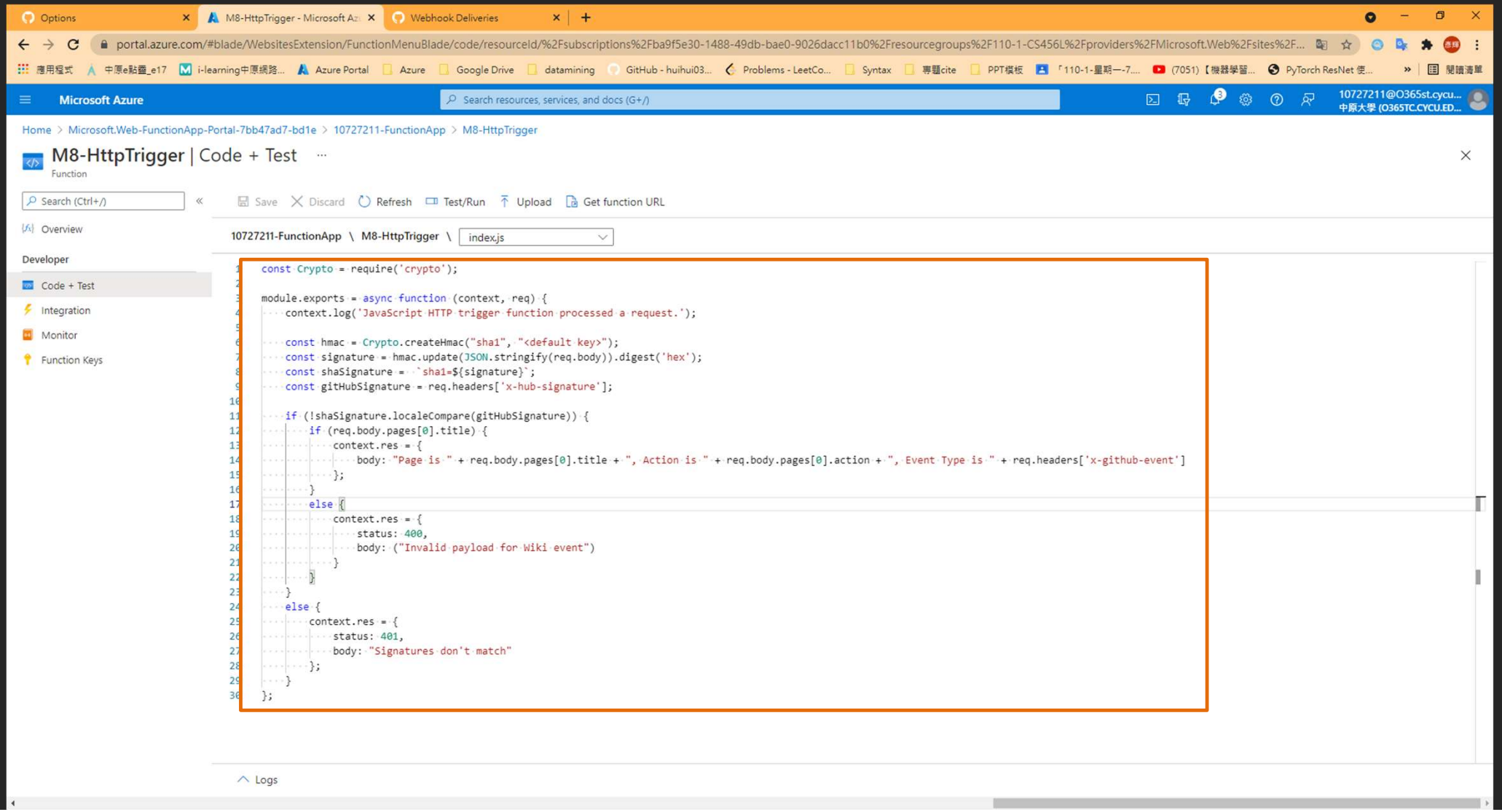
Exercise - Trigger an Azure Function with a GitHub event - 3



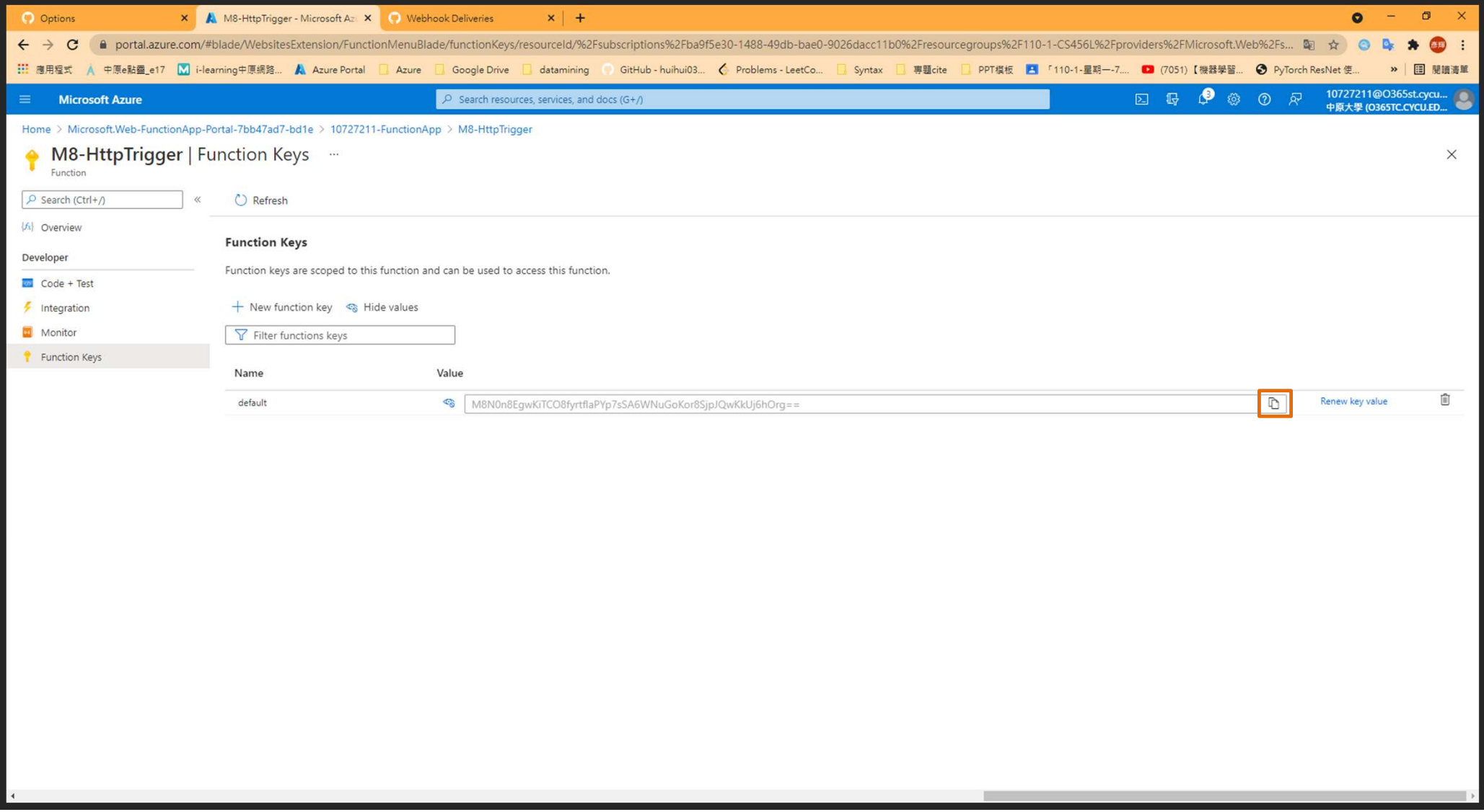
Exercise - Trigger an Azure Function with a GitHub event - 4



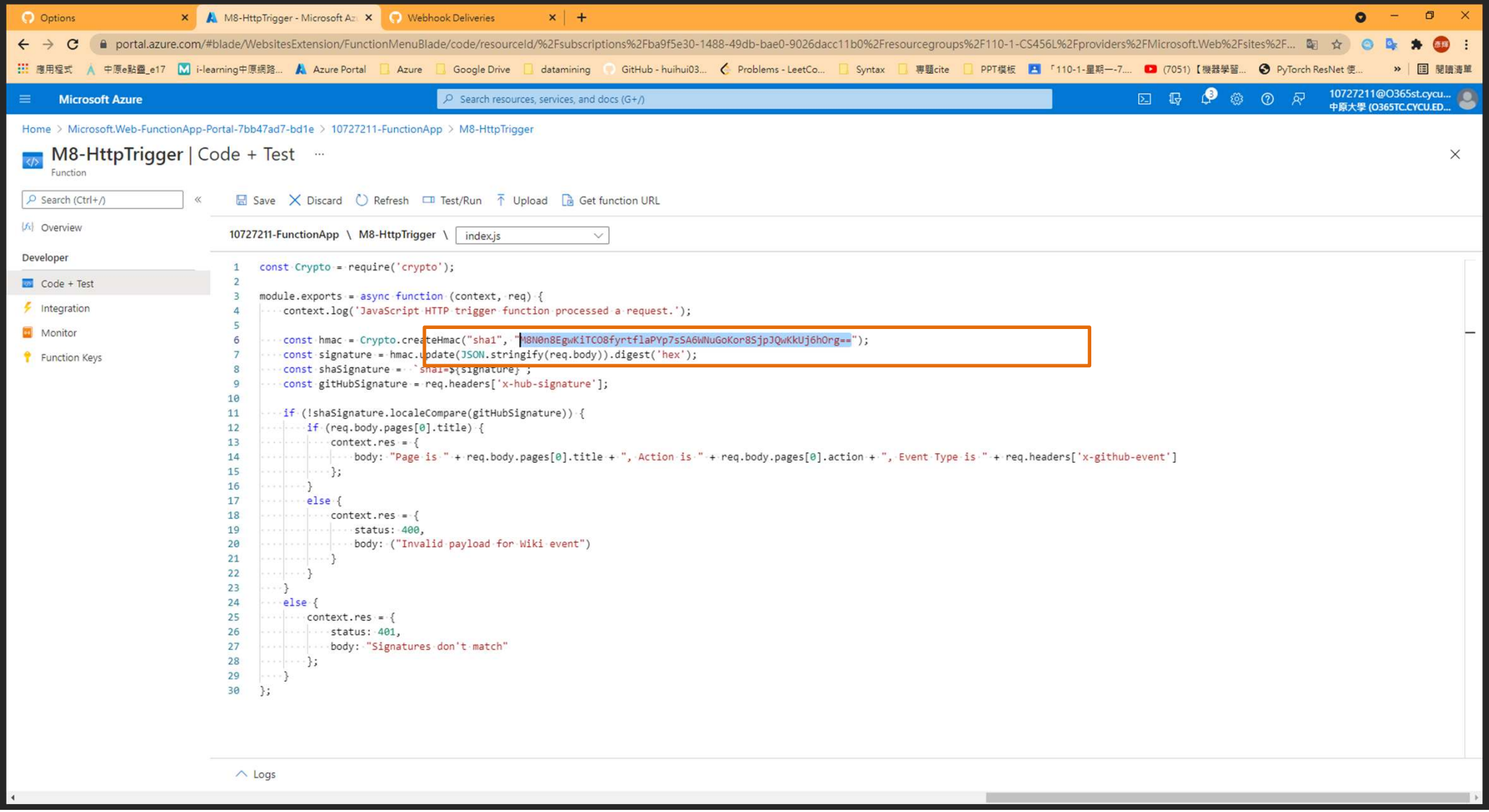
Get a key for your Azure Function



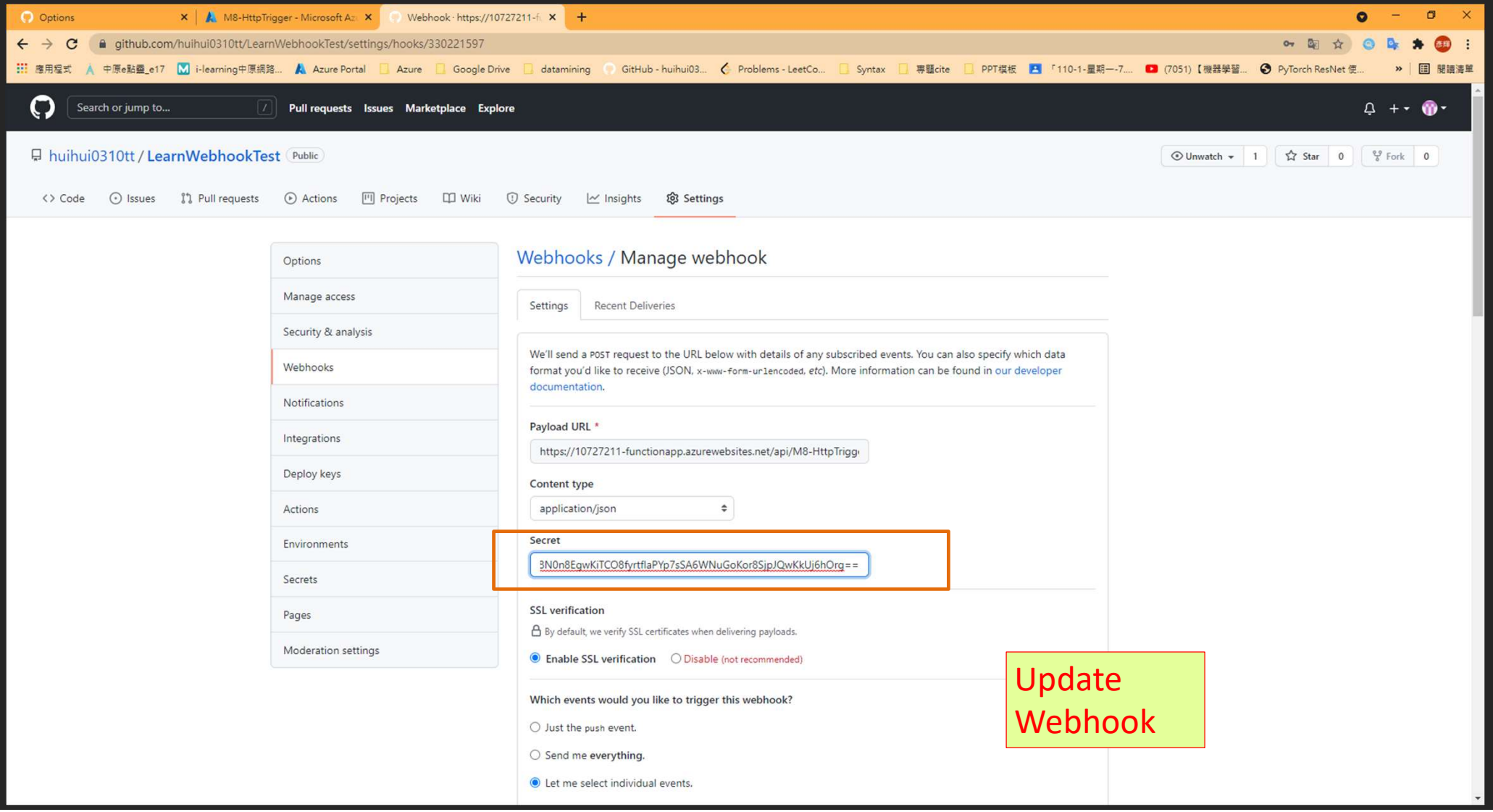
Update the webhook secret - 1



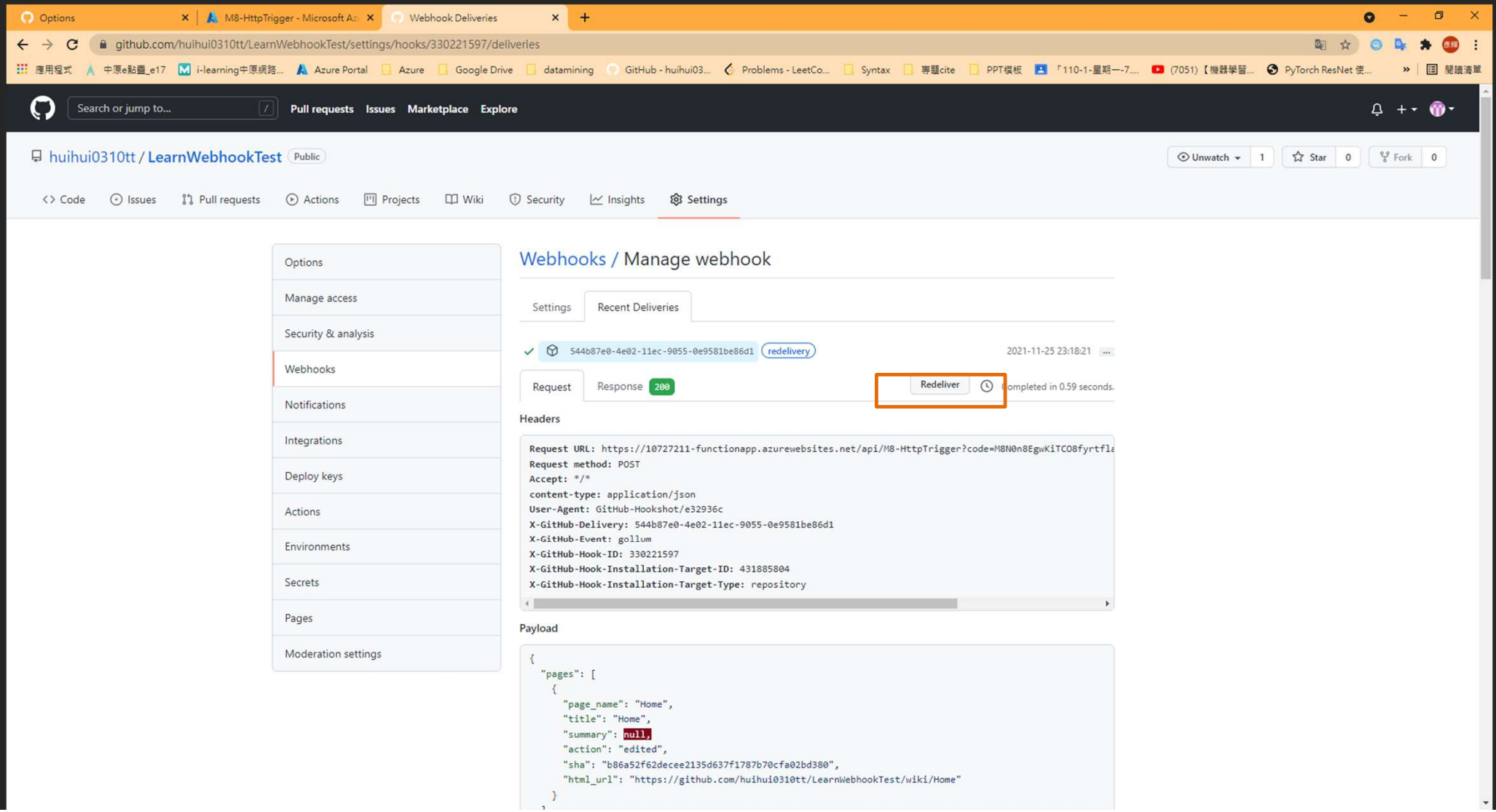
Update the webhook secret - 2



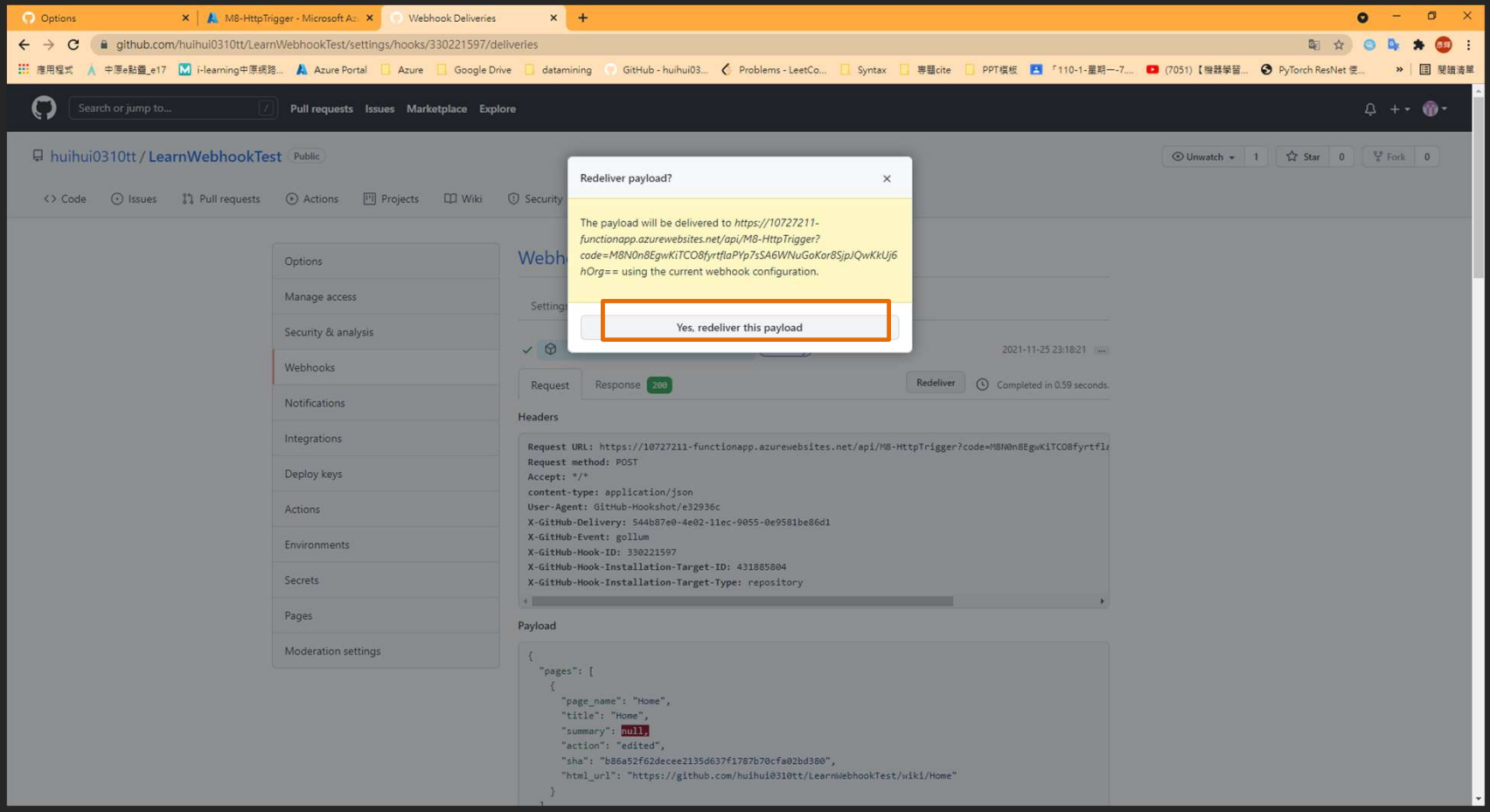
Test the webhook and the Azure Function - 1



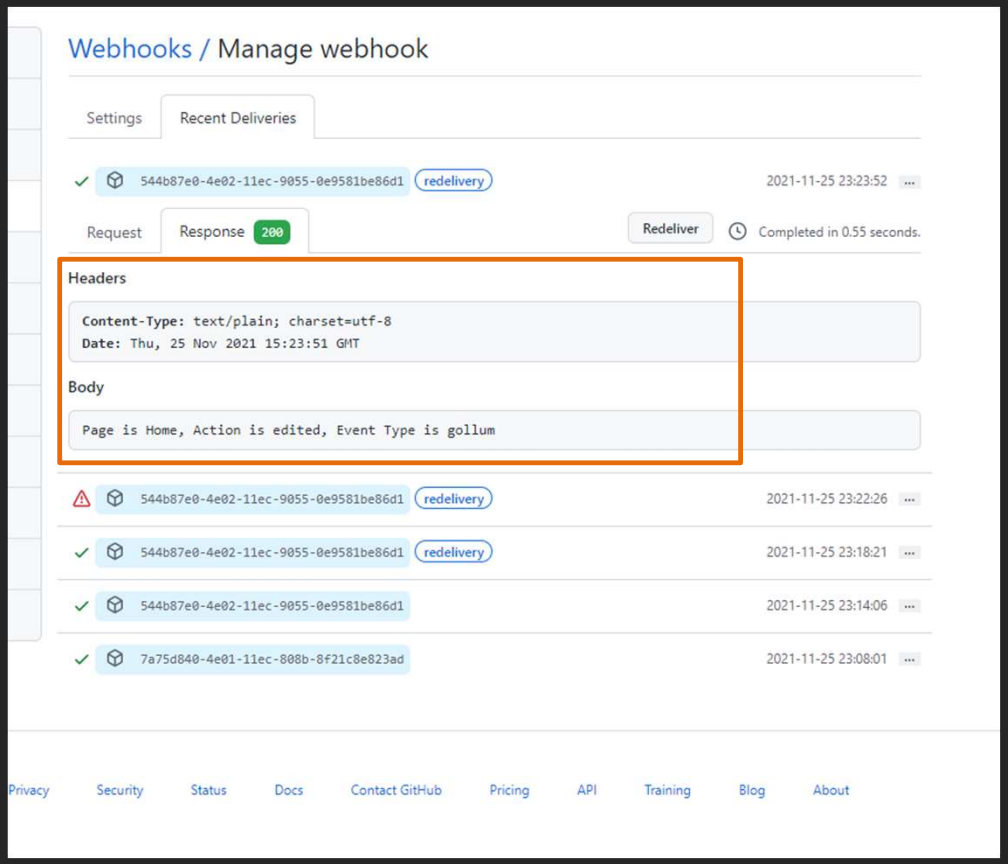
Test the webhook and the Azure Function - 2

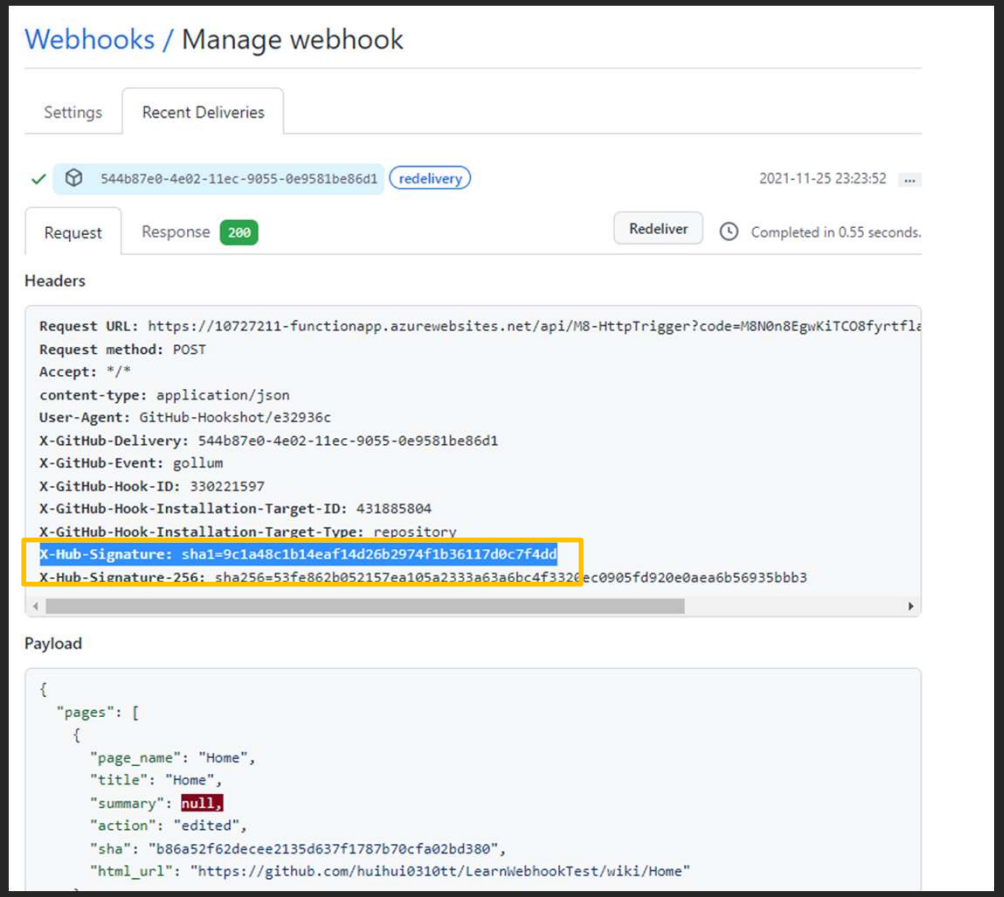


Test the webhook and the Azure Function - 3

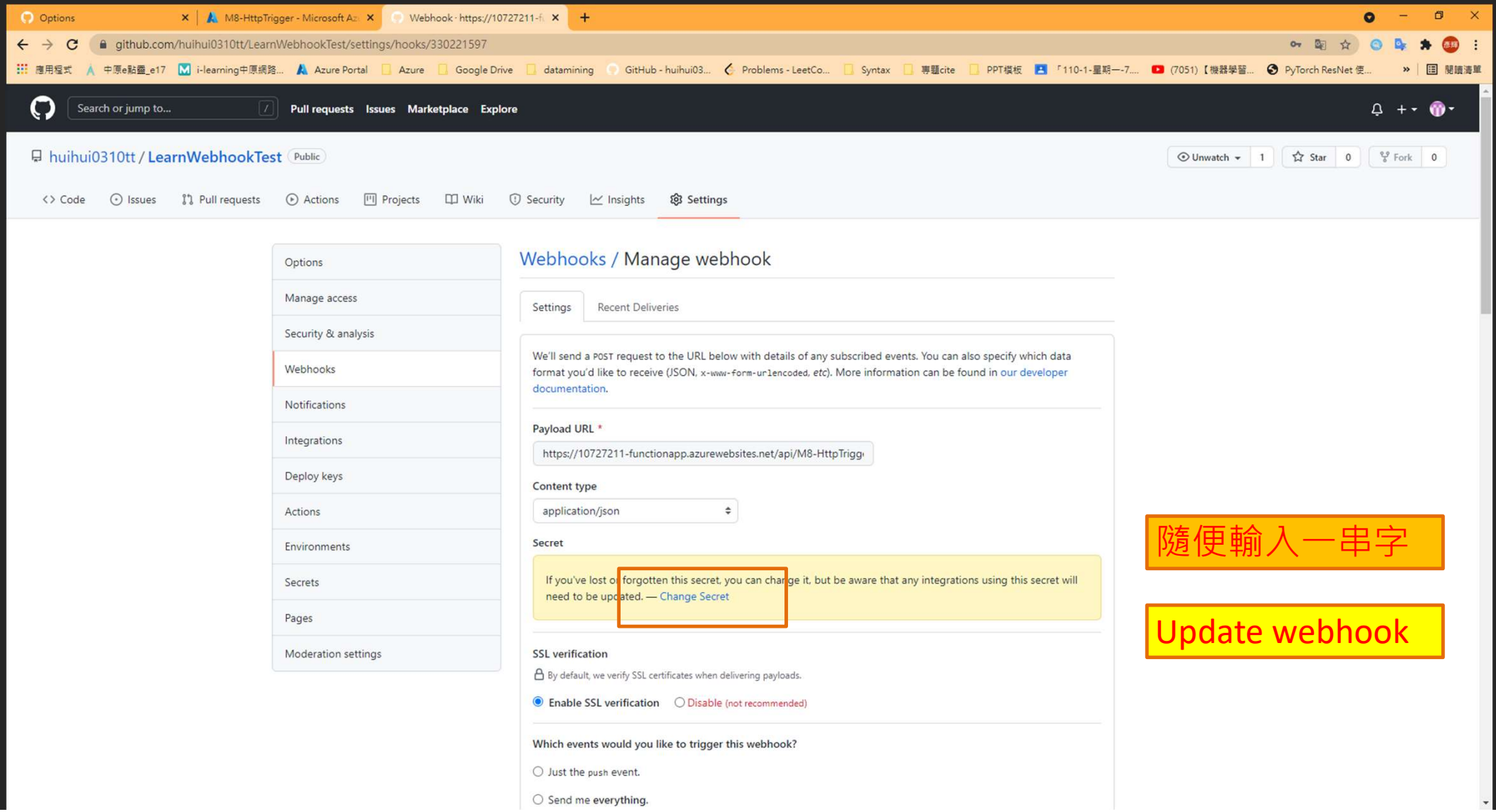


Test the webhook and the Azure Function - 4

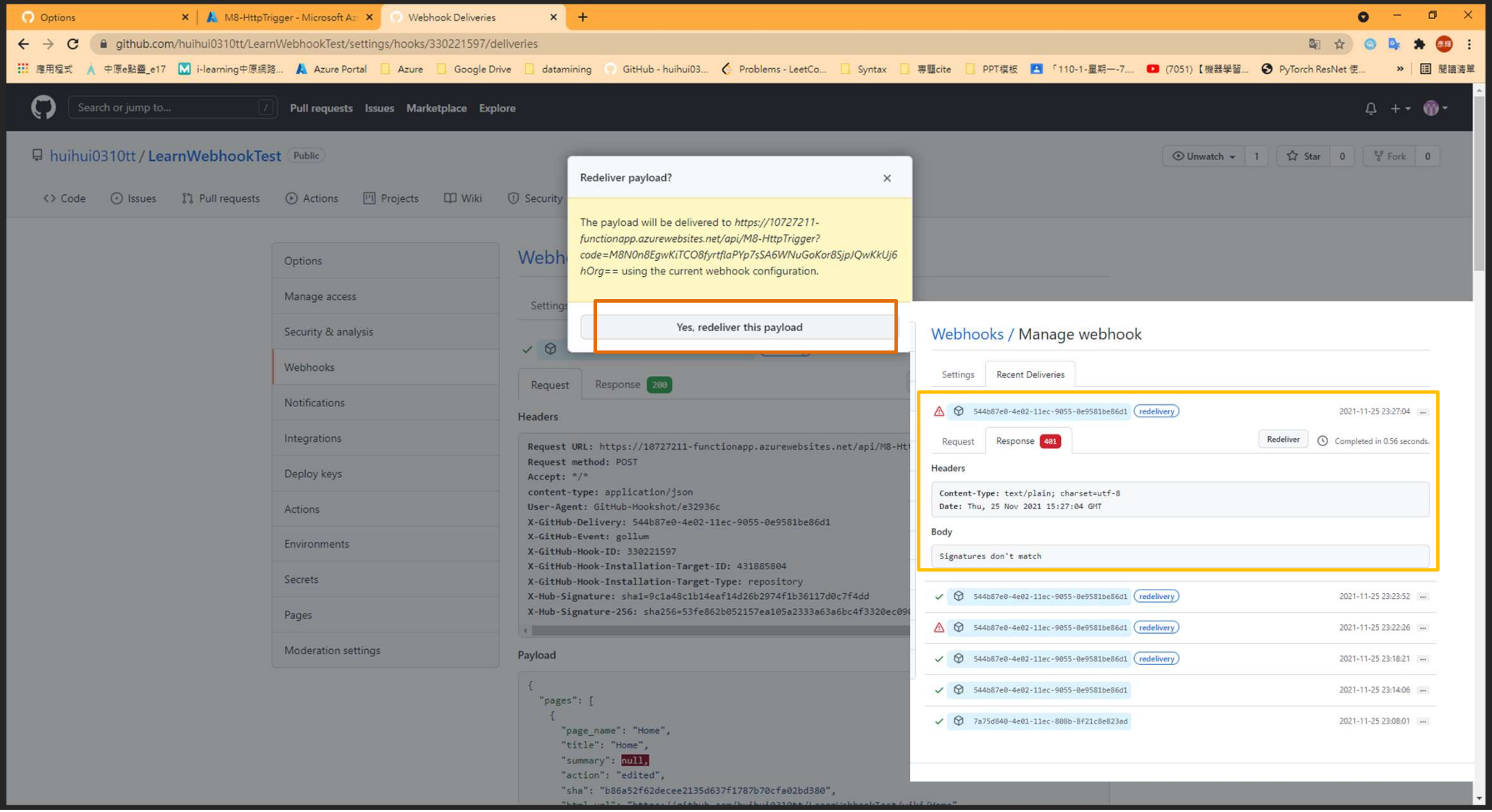




Test an invalid signature - 1



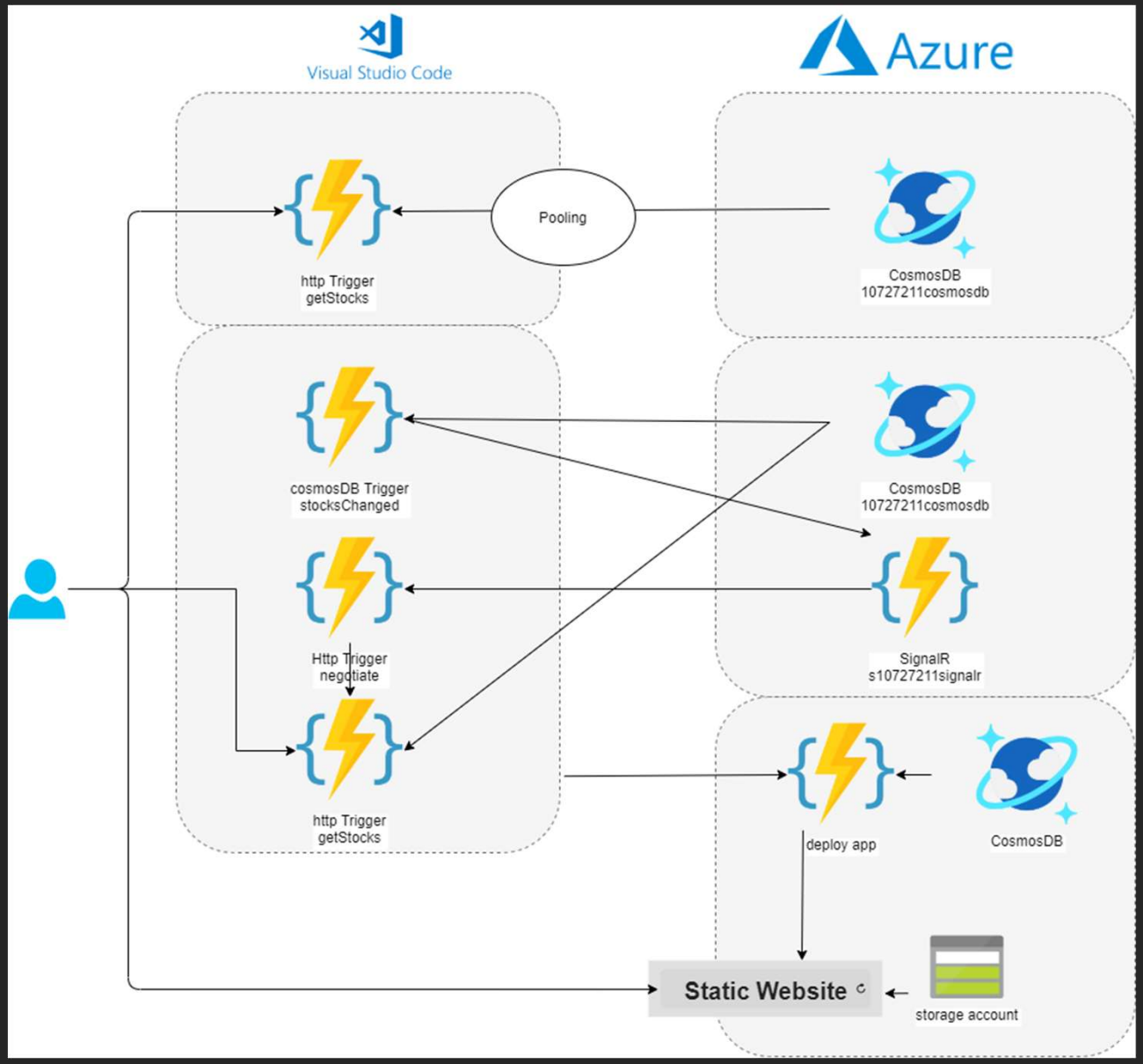
Test an invalid signature - 2



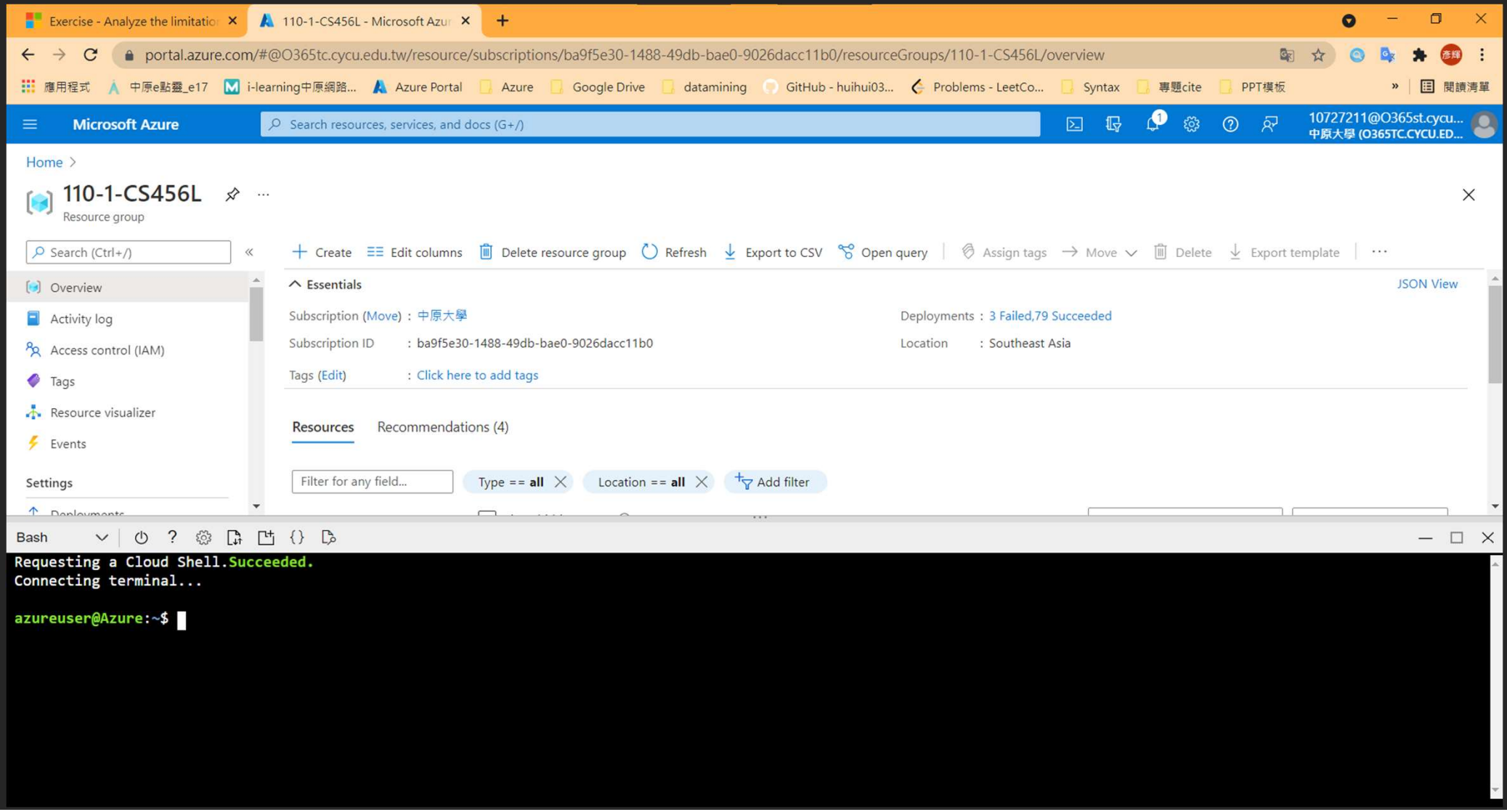
09

Enable automatic updates in a web application using Azure Functions and SignalR Service

Abstract


Visual Studio Code
Azure
Pooling
http Trigger
getStocks
CosmosDB
10727211cosmosdb
cosmosDB Trigger
stocksChanged
CosmosDB
10727211cosmosdb
Http Trigger
negotiate
SignalR
s10727211signalr
http Trigger
getStocks
deploy app
CosmosDB
Static Website
storage account

Create a Storage account and Azure Cosmos DB account - 1



Create a Storage account and Azure Cosmos DB account - 2

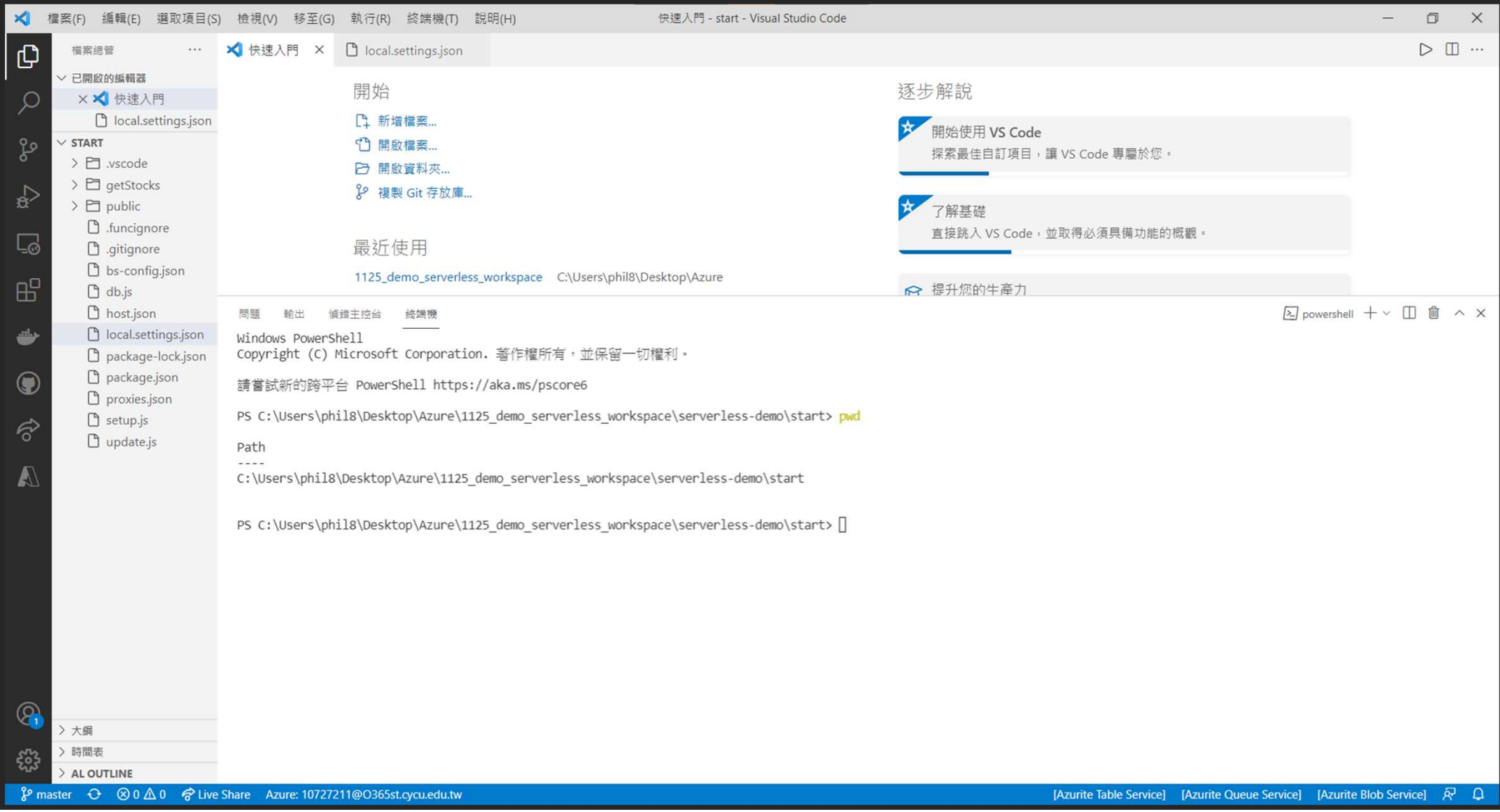
```
export STORAGE_ACCOUNT_NAME=10727211model9storage
echo "Storage Account Name: $STORAGE_ACCOUNT_NAME"
```

```
az storage account create \
  --name $STORAGE_ACCOUNT_NAME \
  --resource-group 110-1-CS456L \
  --kind StorageV2 \
  --sku Standard_LRS
```

```
az cosmosdb create  \
  --name 10727211cosmosdb \
  --resource-group 110-1-CS456L
```

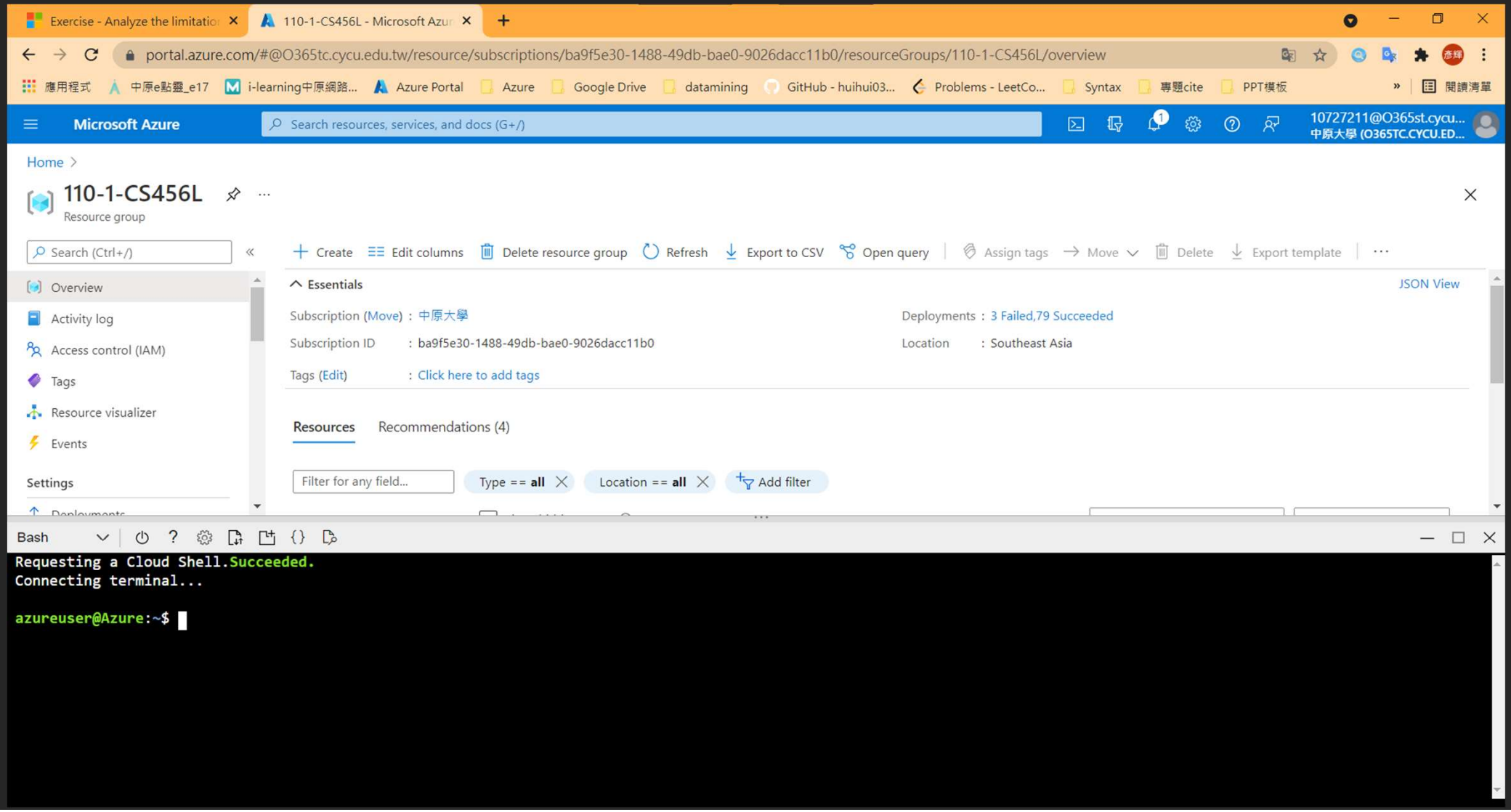
Download sample app code & switch directory

Check path


檔案(F) 編輯(E) 選取項目(S) 檢視(V) 移至(G) 執行(R) 終端機(T) 說明(H)
快速入門 - start - Visual Studio Code
檔案總管
已開啟的編輯器
快速入門
local.settings.json
START
.vscode
getStocks
public
.funcignore
.gitignore
bs-config.json
db.js
host.json
local.settings.json
package-lock.json
package.json
proxies.json
setup.js
update.js
大綱
時間表
AL OUTLINE
快速入門
local.settings.json
開始
新增檔案...
開啟檔案...
開啟資料夾...
複製 Git 存放庫...
最近使用
1125_demo_serverless_workspace C:\Users\phil8\Desktop\Azure
逐步解說
開始使用 VS Code
探索最佳自訂項目，讓 VS Code 專屬於您。
了解基礎
直接跳入 VS Code，並取得必須具備功能的概觀。
提升您的生產力
問題 輸出 偵錯主控台 終端機
powershell
Windows PowerShell
Copyright (C) Microsoft Corporation. 著作權所有，並保留一切權利。
請嘗試新的跨平台 PowerShell https://aka.ms/pscore6
PS C:\Users\phil8\Desktop\Azure\1125_demo_serverless_workspace\serverless-demo\start> pwd
Path

C:\Users\phil8\Desktop\Azure\1125_demo_serverless_workspace\serverless-demo\start
PS C:\Users\phil8\Desktop\Azure\1125_demo_serverless_workspace\serverless-demo\start>
master
0 0
Live Share
Azure: 10727211@O365st.cycu.edu.tw
[Azurite Table Service]
[Azurite Queue Service]
[Azurite Blob Service]

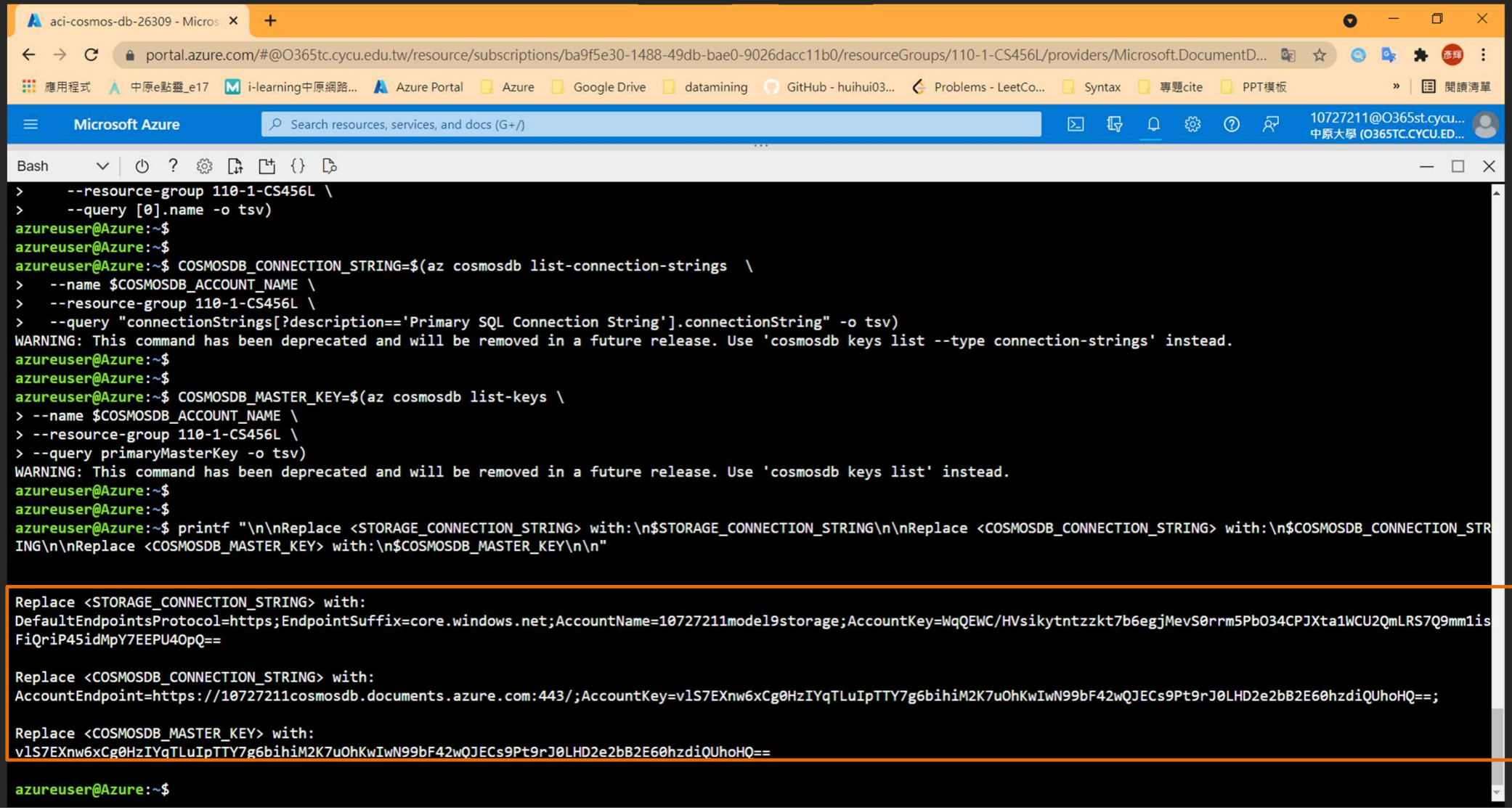
Update local settings - 1



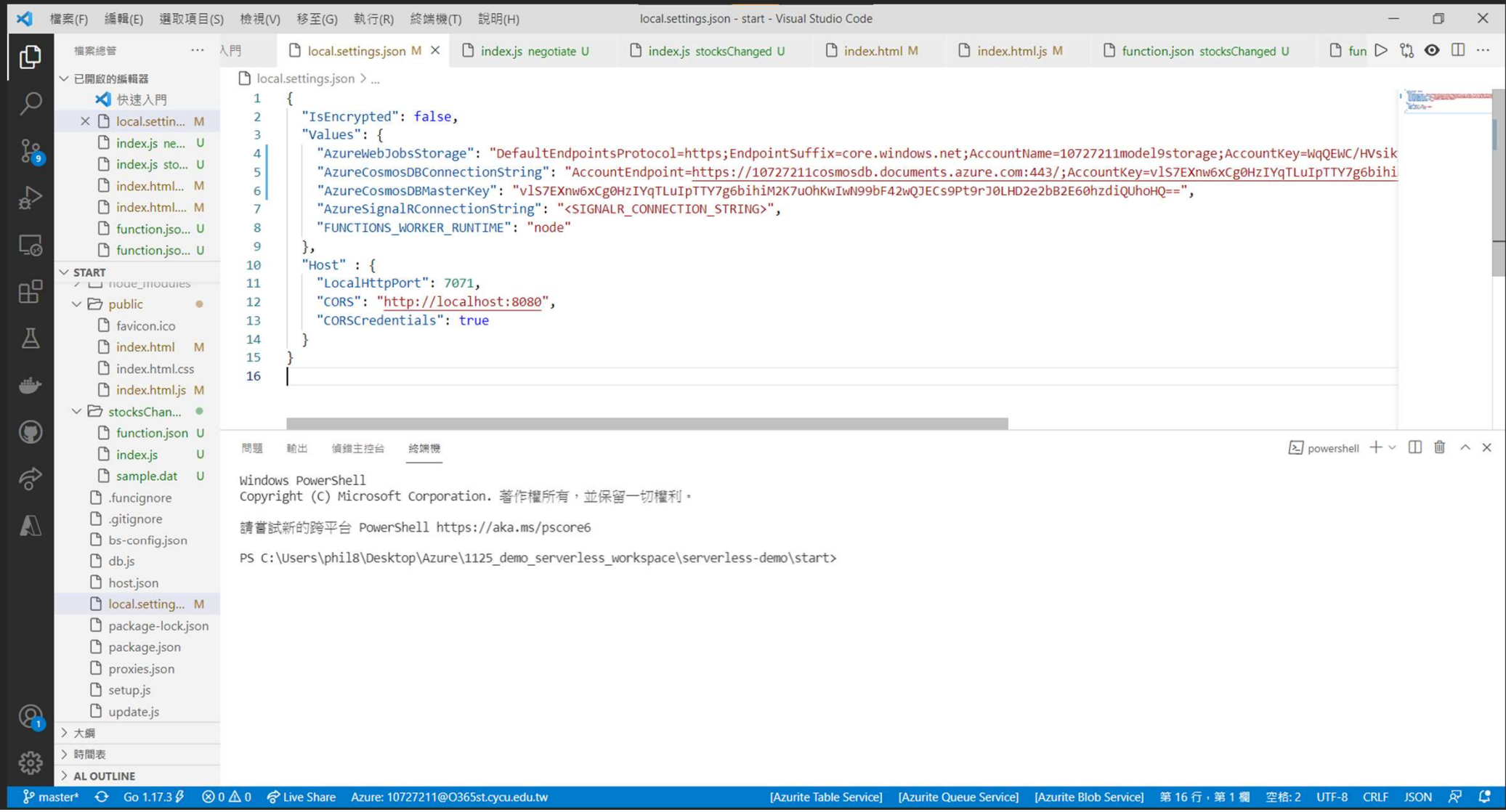
Update local settings - 2

```
STORAGE_CONNECTION_STRING=$(az storage account show-connection-string \
--name $(az storage account list \
  --resource-group 110-1-CS456L \
  --query [0].name -o tsv) \
--resource-group 110-1-CS456L \
--query "connectionString" -o tsv)


COSMOSDB_ACCOUNT_NAME=$(az cosmosdb list \
    --resource-group 110-1-CS456L \
    --query [0].name -o tsv)


COSMOSDB_CONNECTION_STRING=$(az cosmosdb list-connection-strings  \
  --name $COSMOSDB_ACCOUNT_NAME \
  --resource-group 110-1-CS456L \
  --query "connectionStrings[?description=='Primary SQL Connection String'].connectionString" -o tsv)


COSMOSDB_MASTER_KEY=$(az cosmosdb list-keys \
--name $COSMOSDB_ACCOUNT_NAME \
--resource-group 110-1-CS456L \
--query primaryMasterKey -o tsv)


printf "\n\nReplace <STORAGE_CONNECTION_STRING> with:\n$STORAGE_CONNECTION_STRING\n\nReplace <COSMOSDB_CONNECTION_STRING>
with:\n$COSMOSDB_CONNECTION_STRING\n\nReplace <COSMOSDB_MASTER_KEY> with:\n$COSMOSDB_MASTER_KEY\n\n"
```

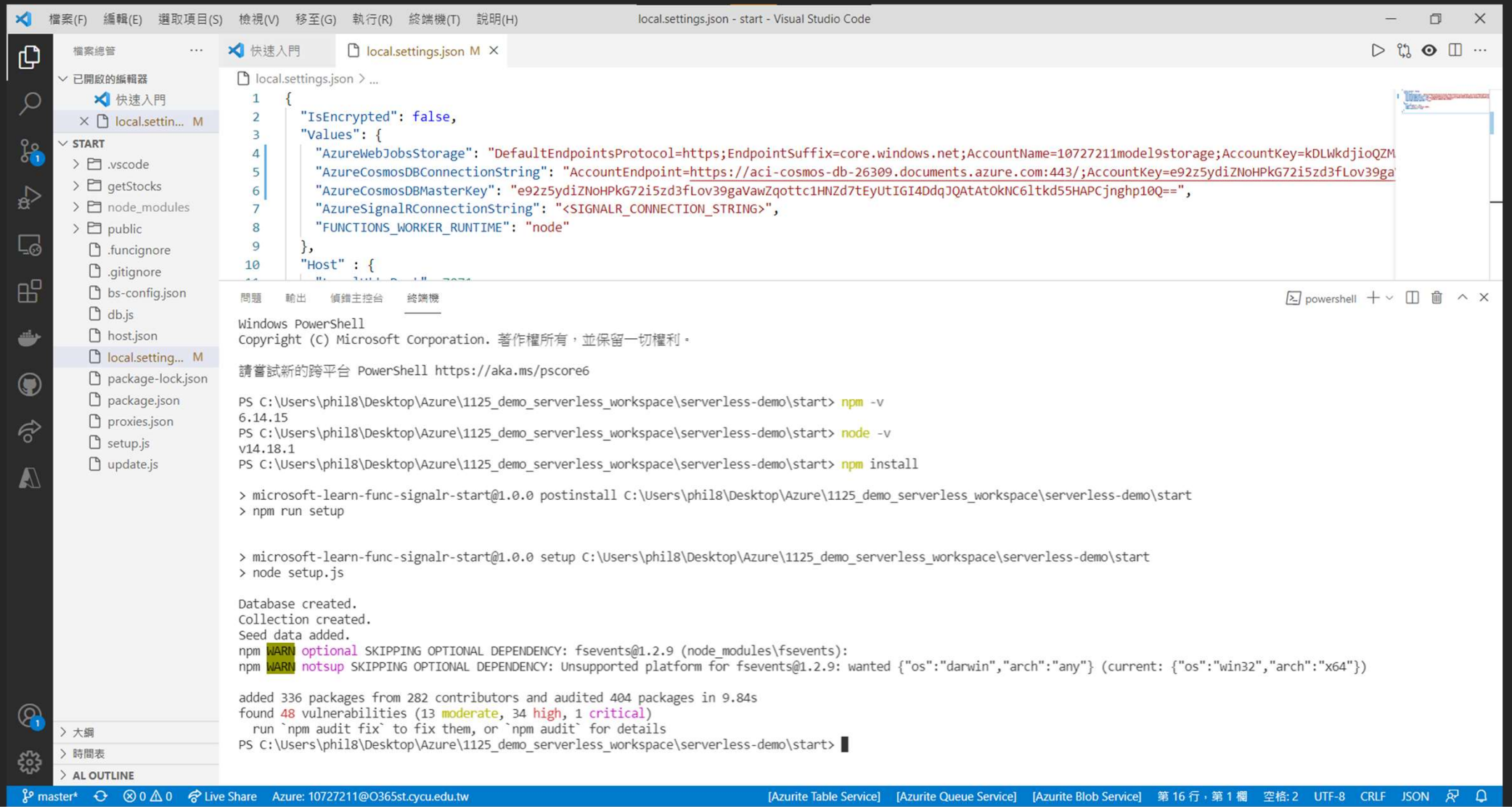
Update local settings - 3



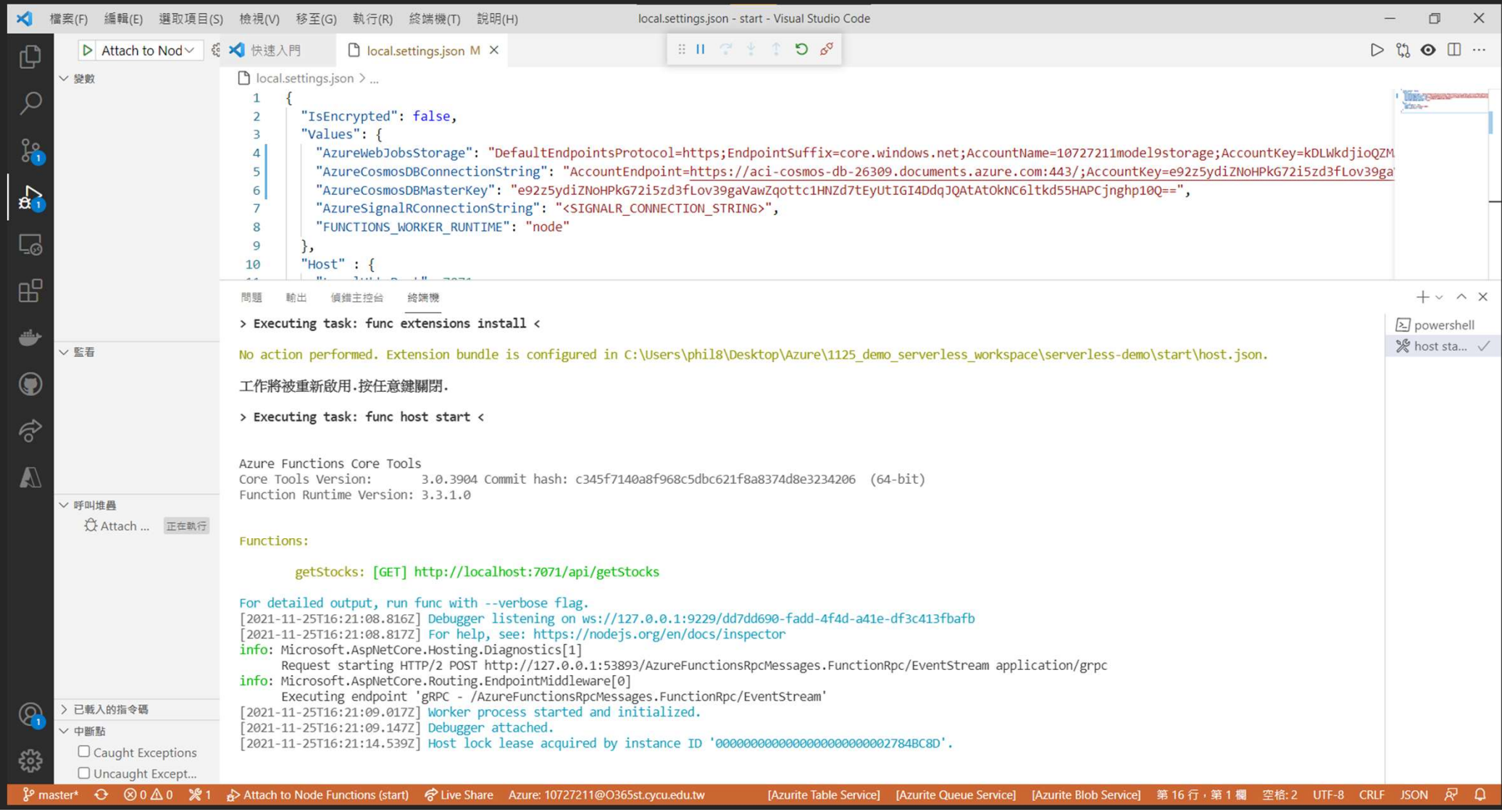
Update local settings - 4



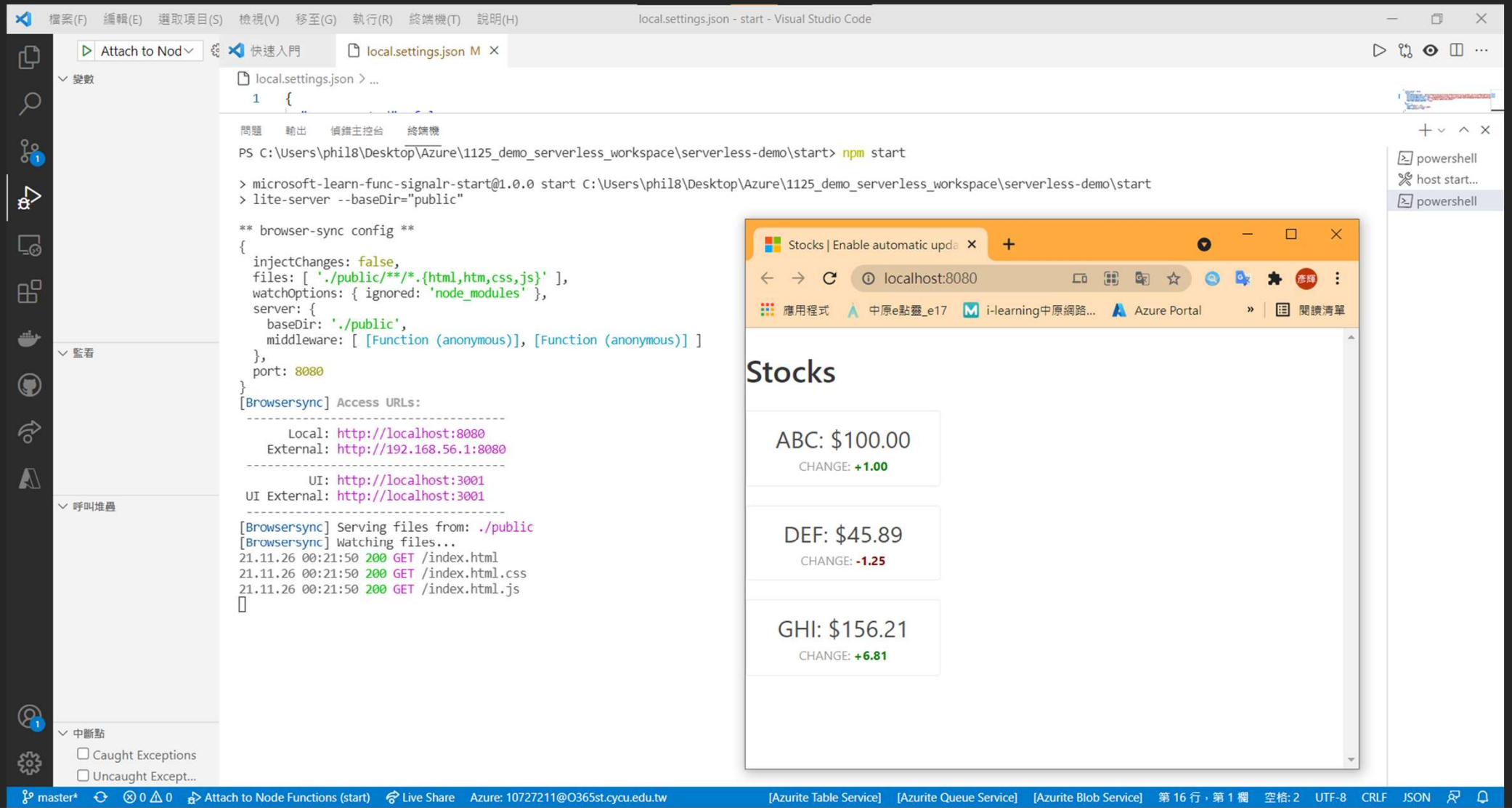
Run the application - 1



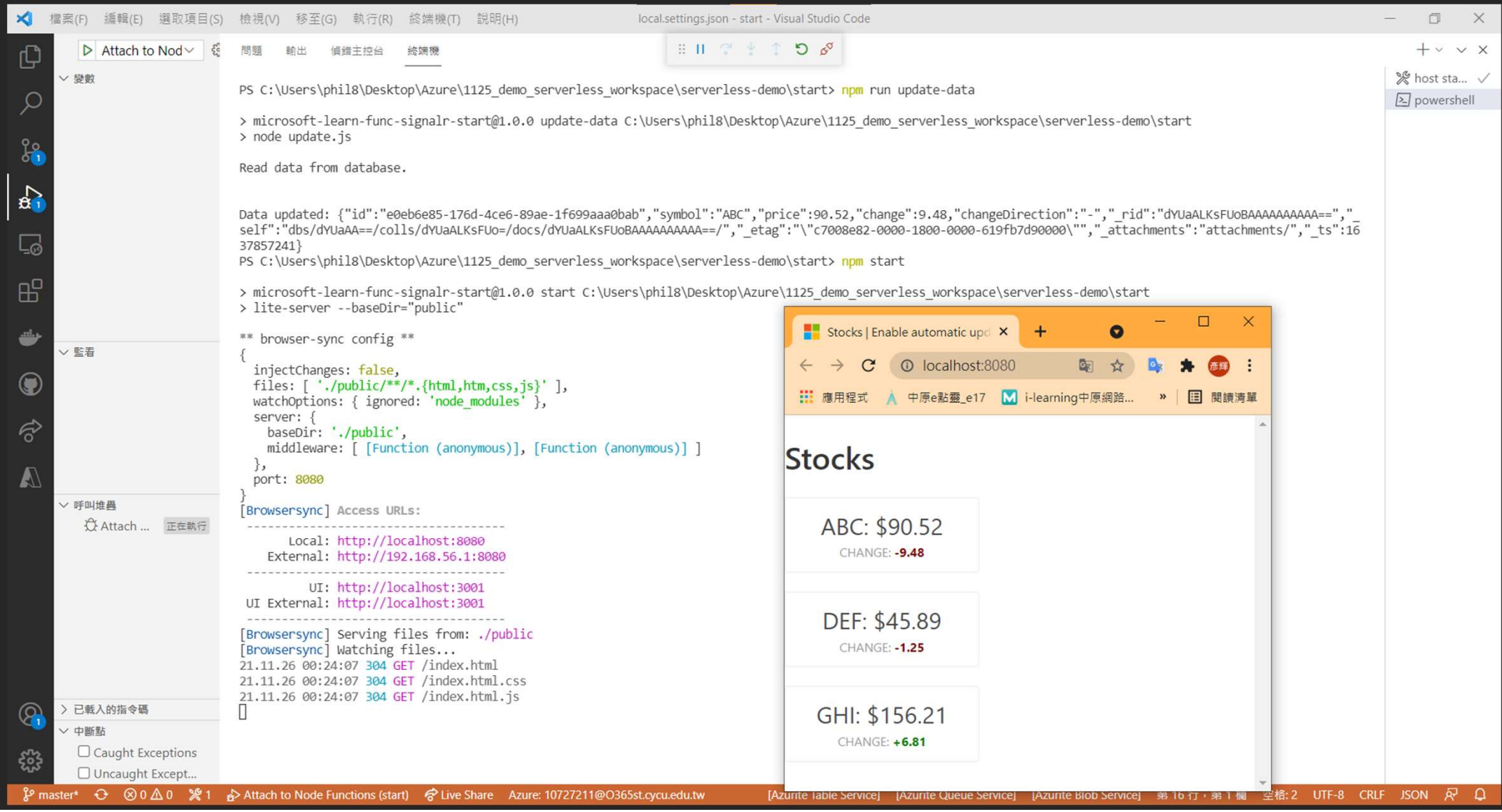
Run the application - 2



Run the application - 3



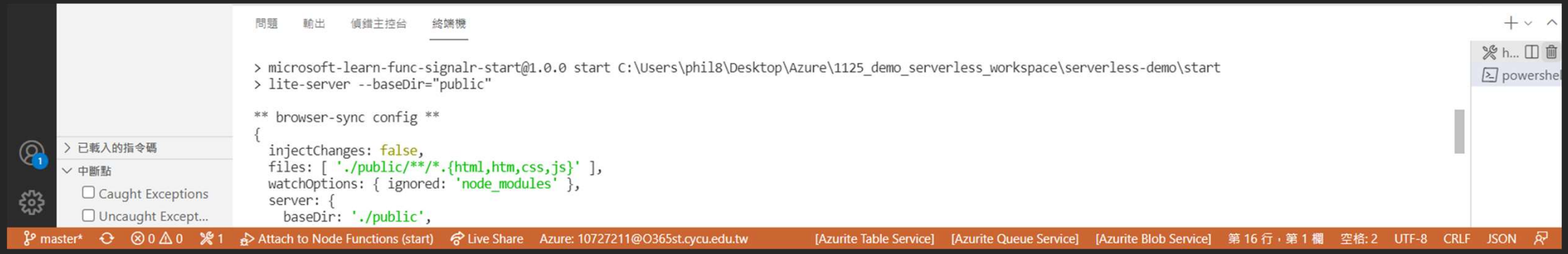
Run the application - 4



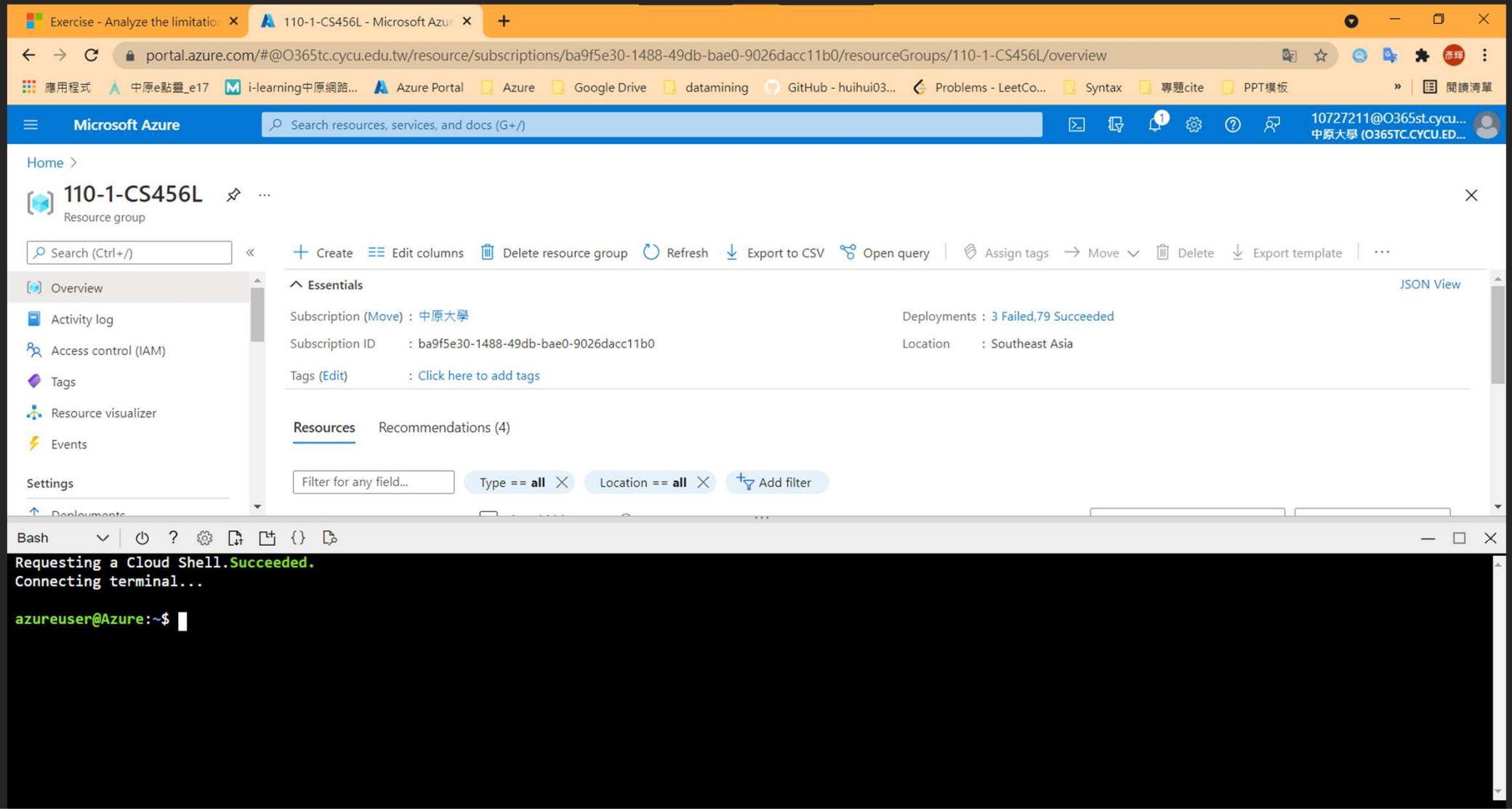
Run the application - 5

When you're done, stop the running processes.

- To stop the web server, select the **kill process** (trash can icon) on the terminal window that is running the web server.
- To stop the functions app, select **Stop** or press `Shift+F5`.



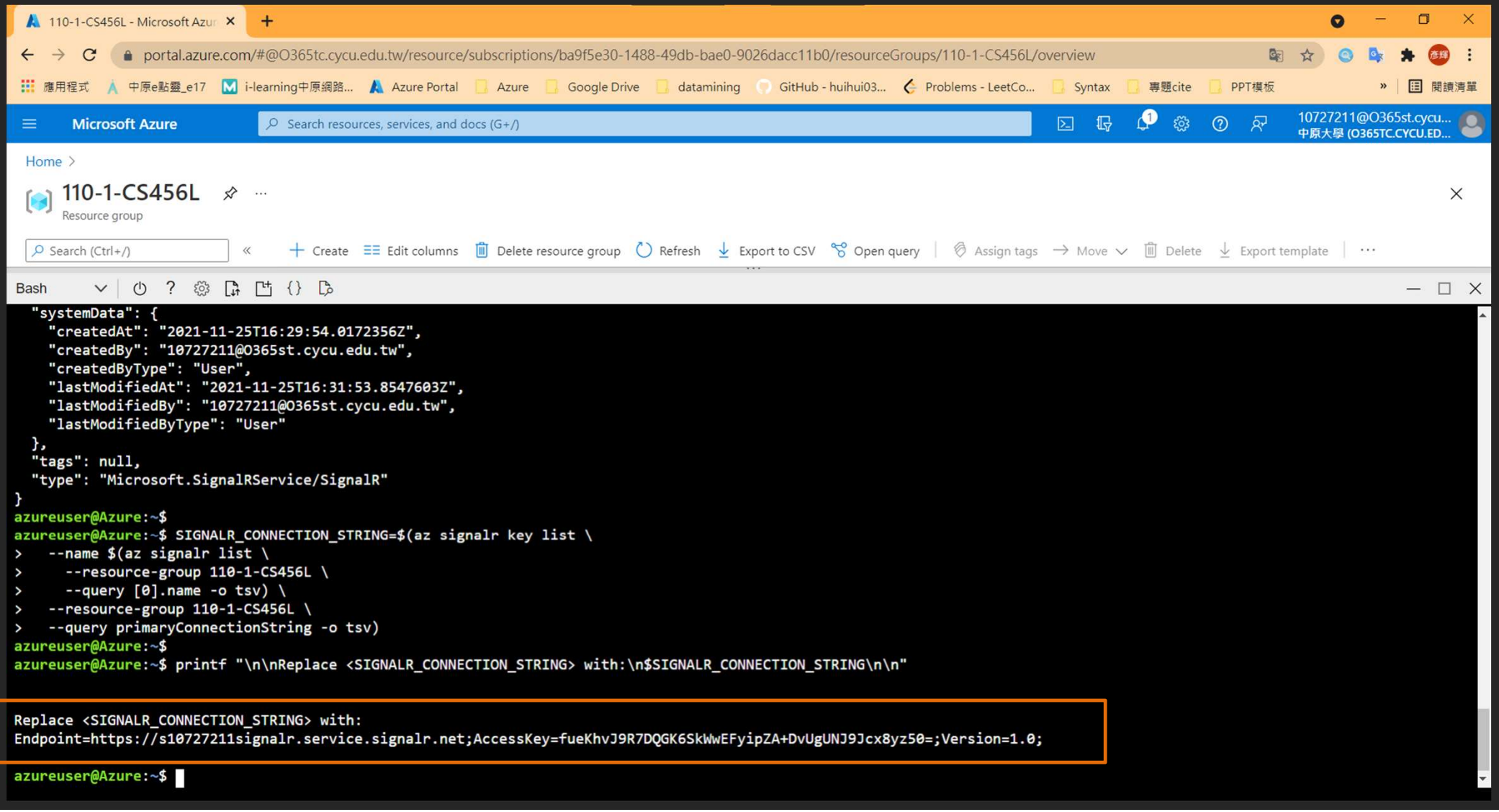
Create a SignalR account - 1



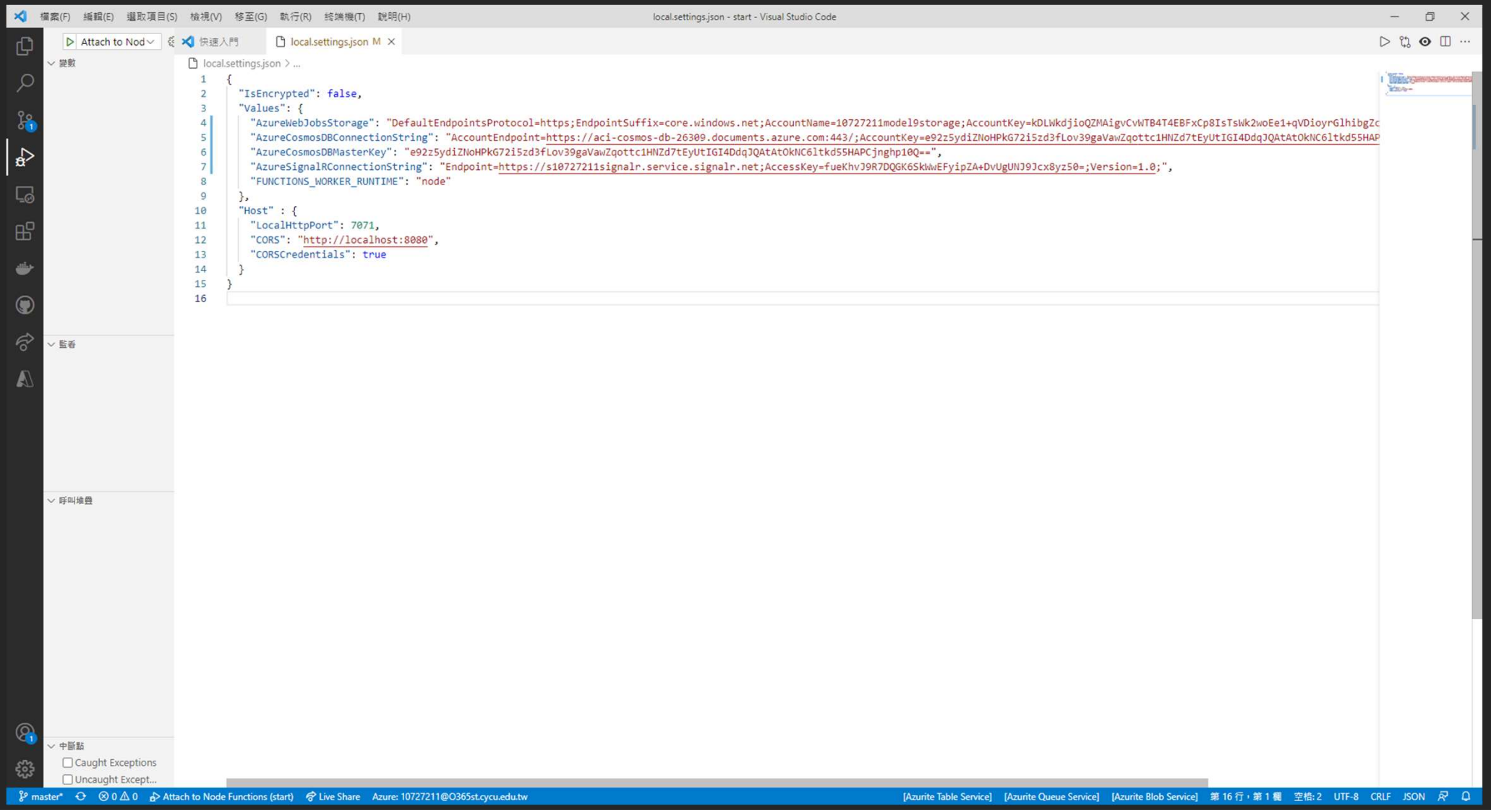
Create a SignalR account - 2

```
SIGNALR_SERVICE_NAME=s10727211signalr

az signalr create \
  --name $SIGNALR_SERVICE_NAME \
  --resource-group 110-1-CS456L \
  --sku Free_DS2 \
  --unit-count 1


az resource update \
  --resource-type Microsoft.SignalRService/SignalR \
  --name $SIGNALR_SERVICE_NAME \
  --resource-group 110-1-CS456L \
  --set properties.features[flag=ServiceMode].value=Serverless




SIGNALR_CONNECTION_STRING=$(az signalr key list \
  --name $(az signalr list \
    --resource-group 110-1-CS456L \
    --query [0].name -o tsv) \
  --resource-group 110-1-CS456L \
  --query primaryConnectionString -o tsv)

printf "\n\nReplace <SIGNALR_CONNECTION_STRING> with:\n$SIGNALR_CONNECTION_STRING\n\n"
```

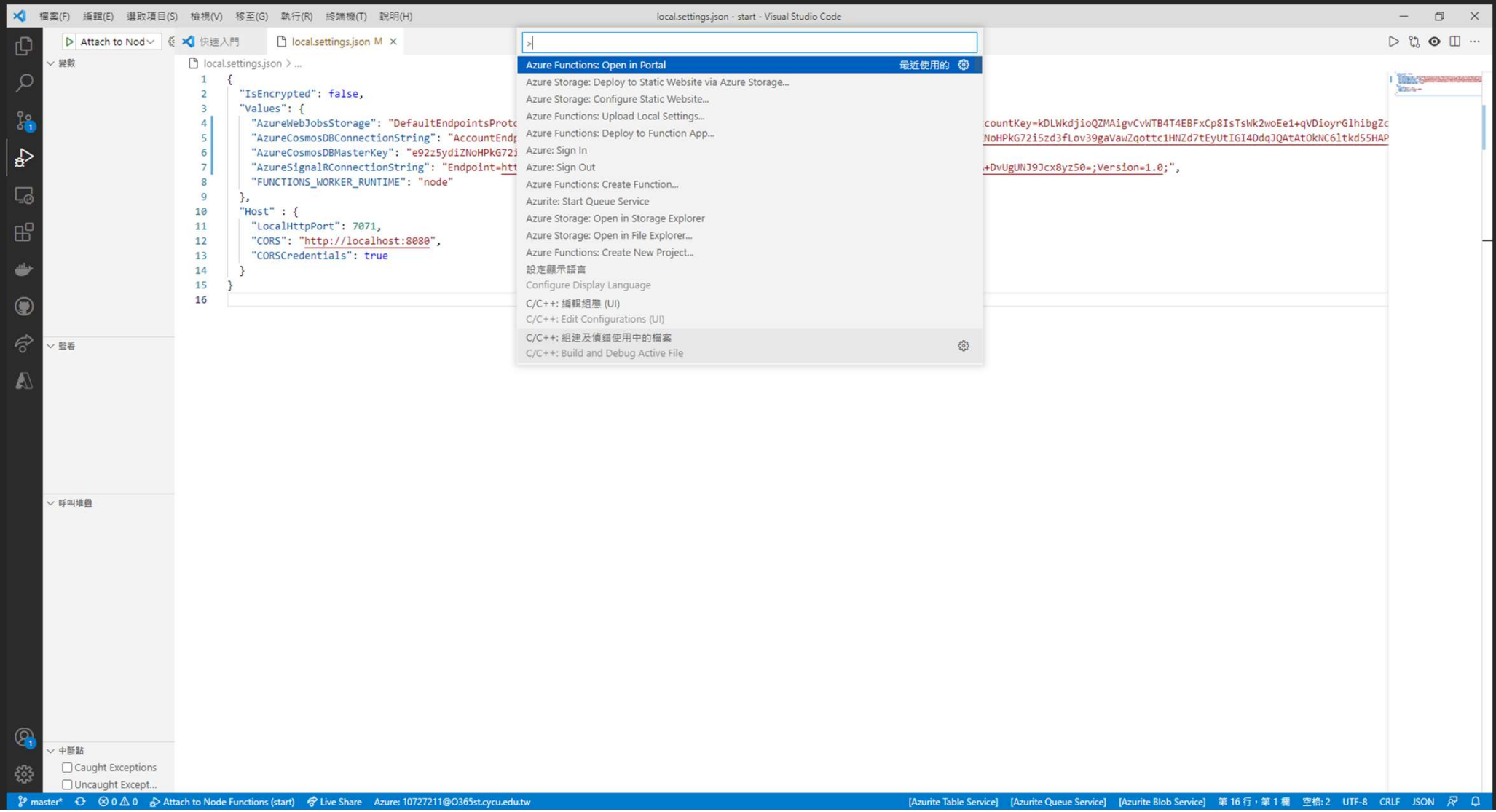
Update local settings - 1



Update local settings - 2



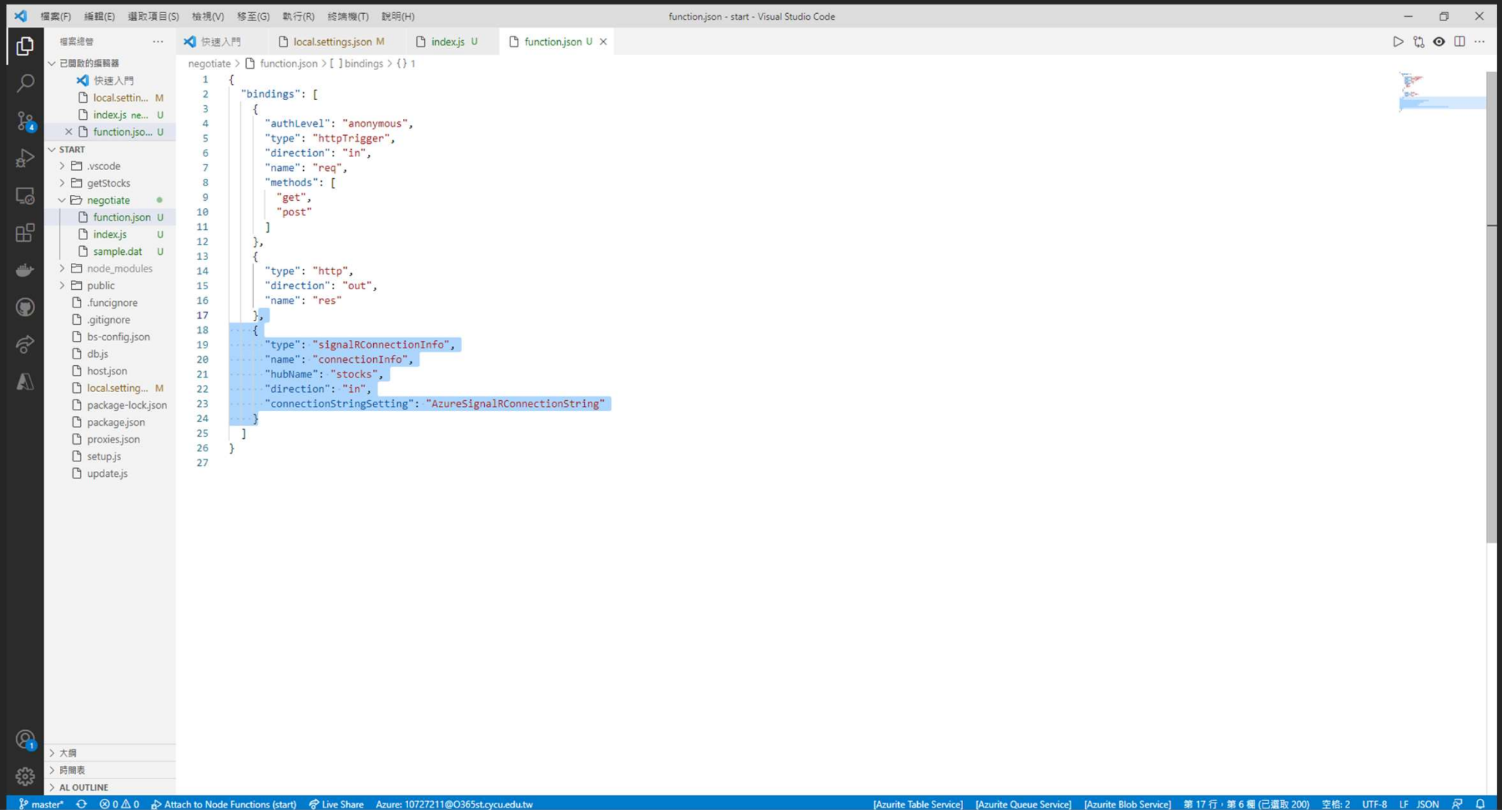
Manage client connections- 1



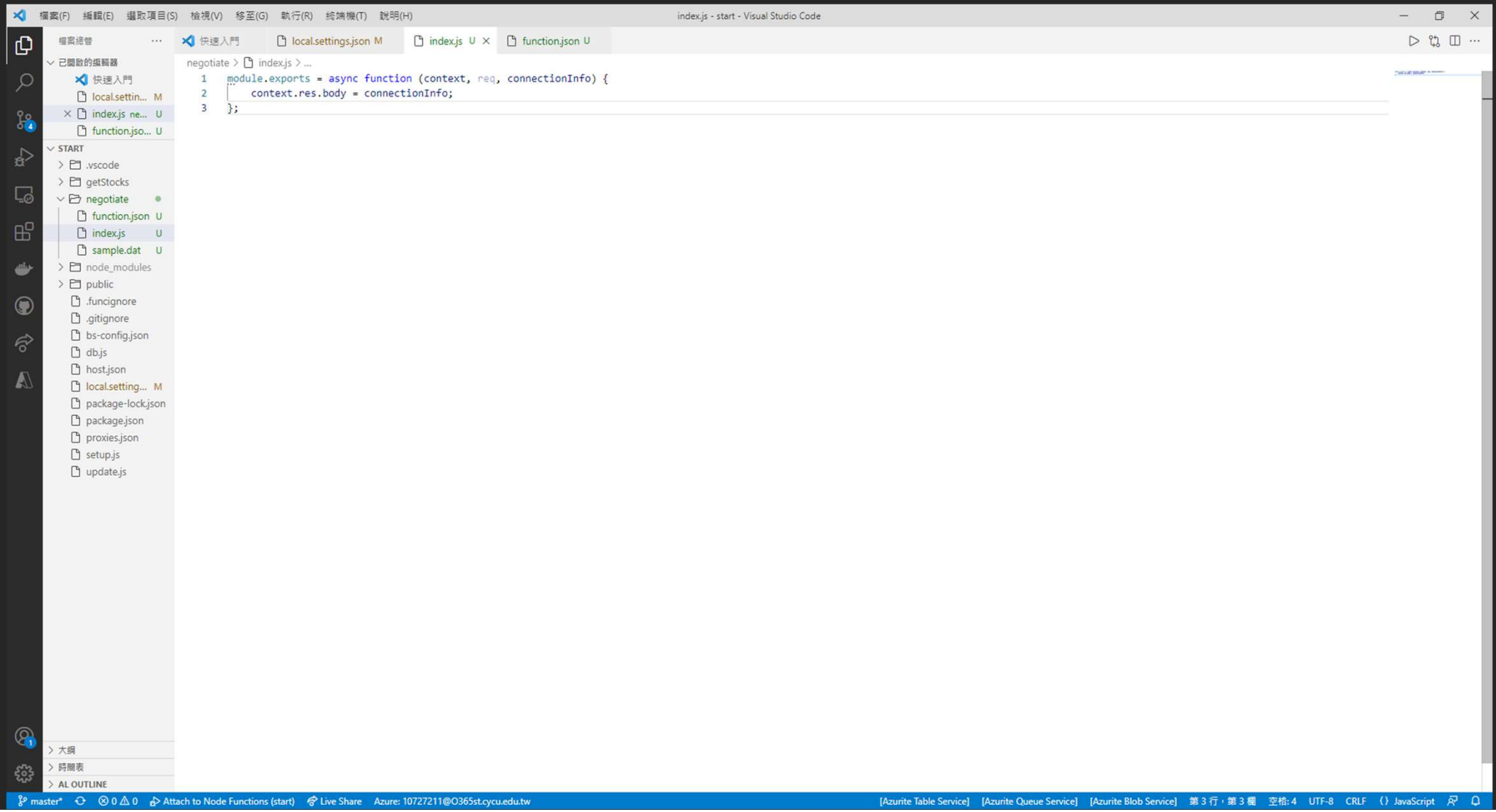
Manage client connections- 2

	Azure Functions: Create Function
Template	HTTP Trigger
Name	negotiate
Authorization level	Anonymous

Manage client connections- 3



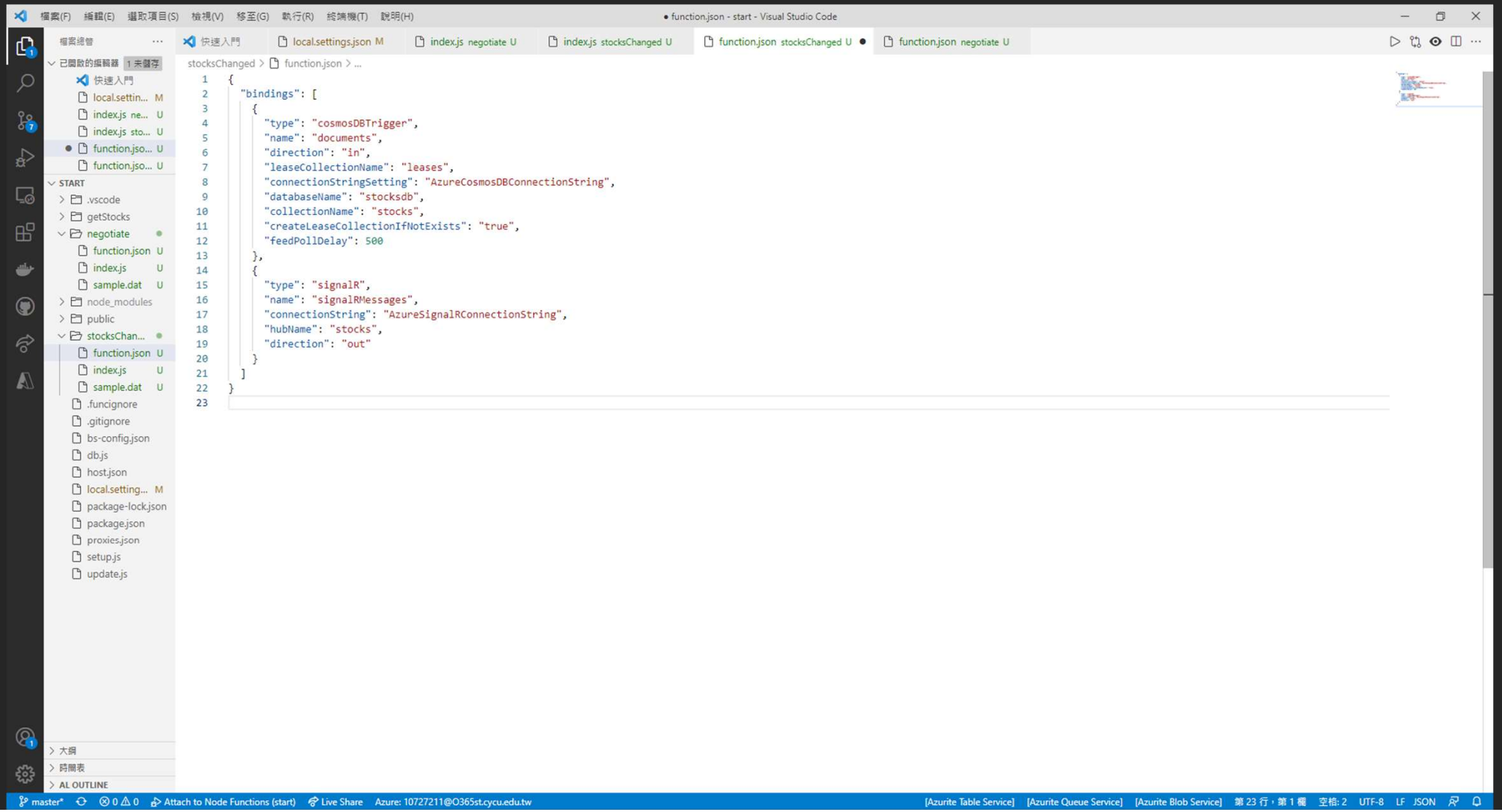
Manage client connections- 4



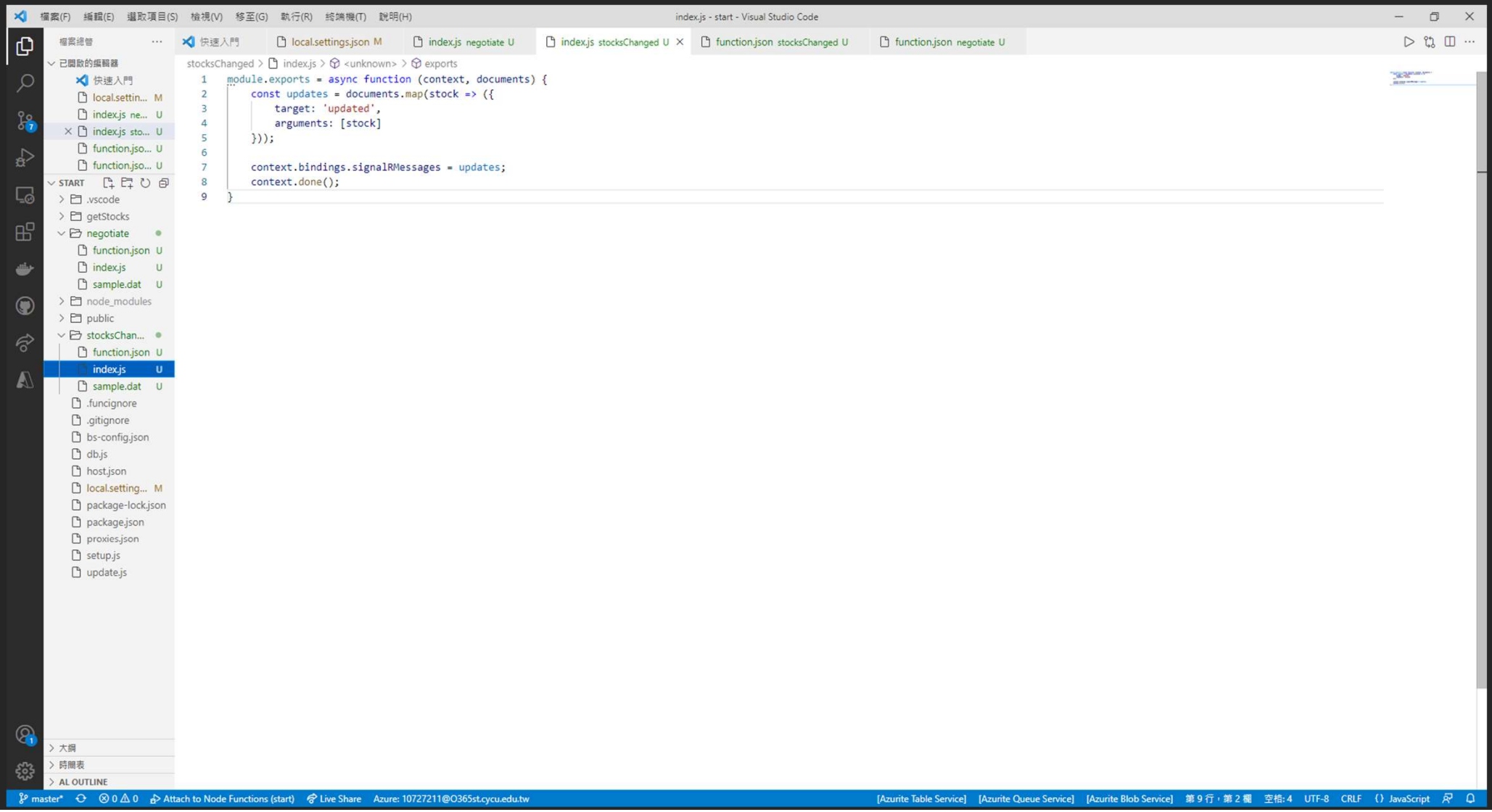
Detect and broadcast database changes - 1

	Azure Functions: Create Function
Template	Azure Cosmos DB Trigger
Name	stocksChanged
App setting for your Azure Cosmos DB account	AzureCosmosDBConnectionString
Database name	stocksdb
Collection name	stocks
Collection name for leases	leases
Create lease collection if not exists	true

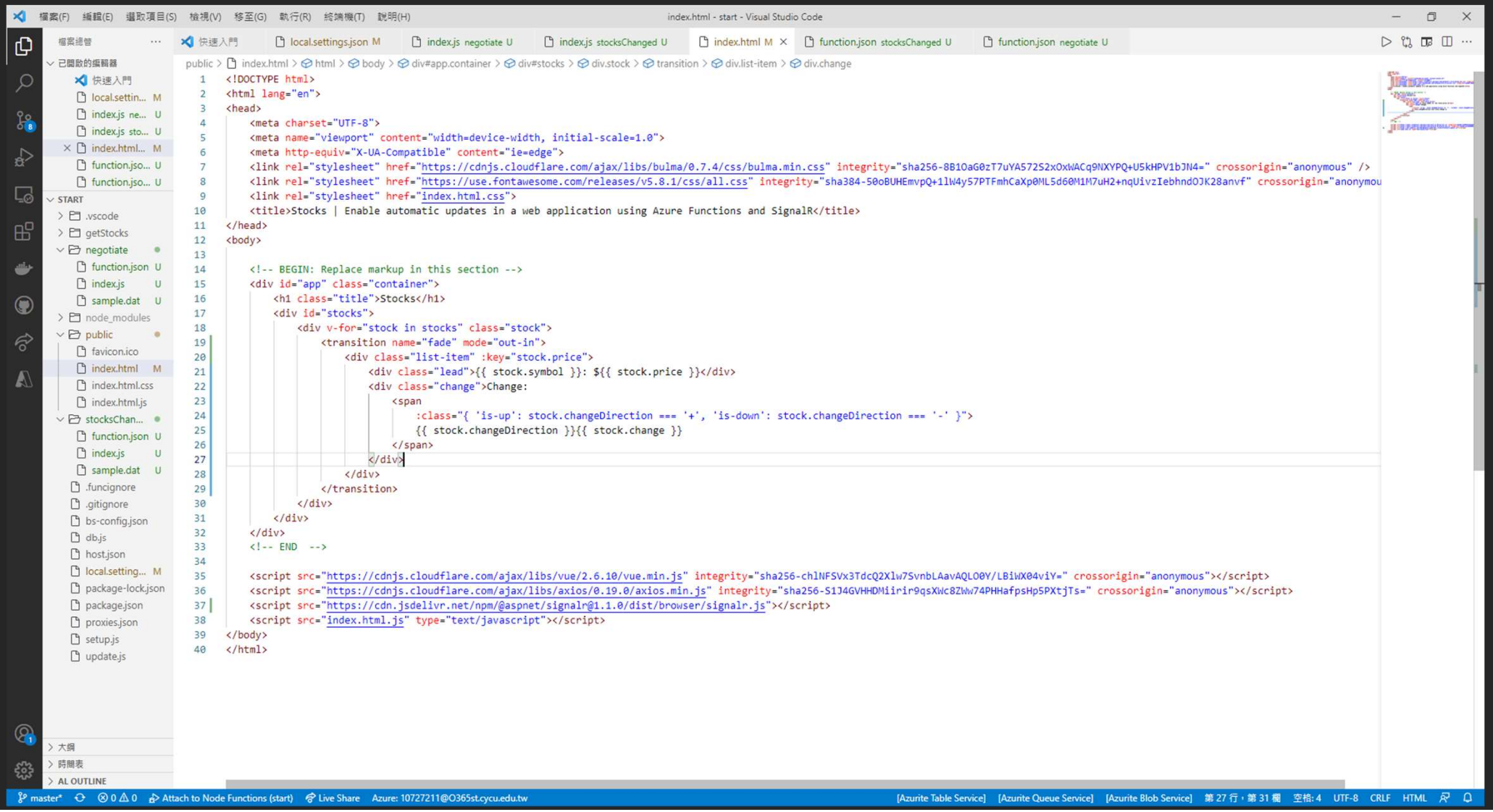
Detect and broadcast database changes - 2



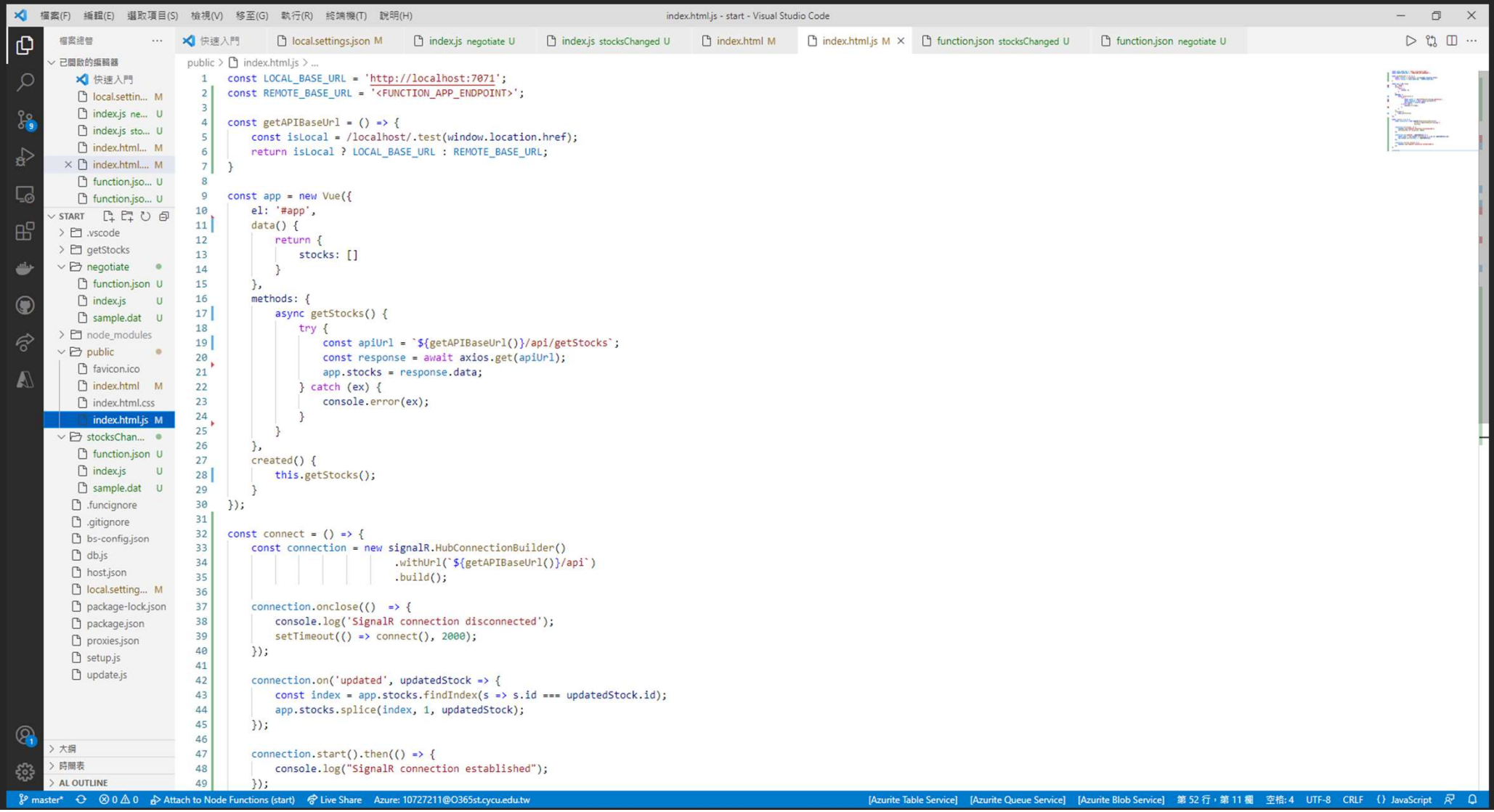
Detect and broadcast database changes - 3



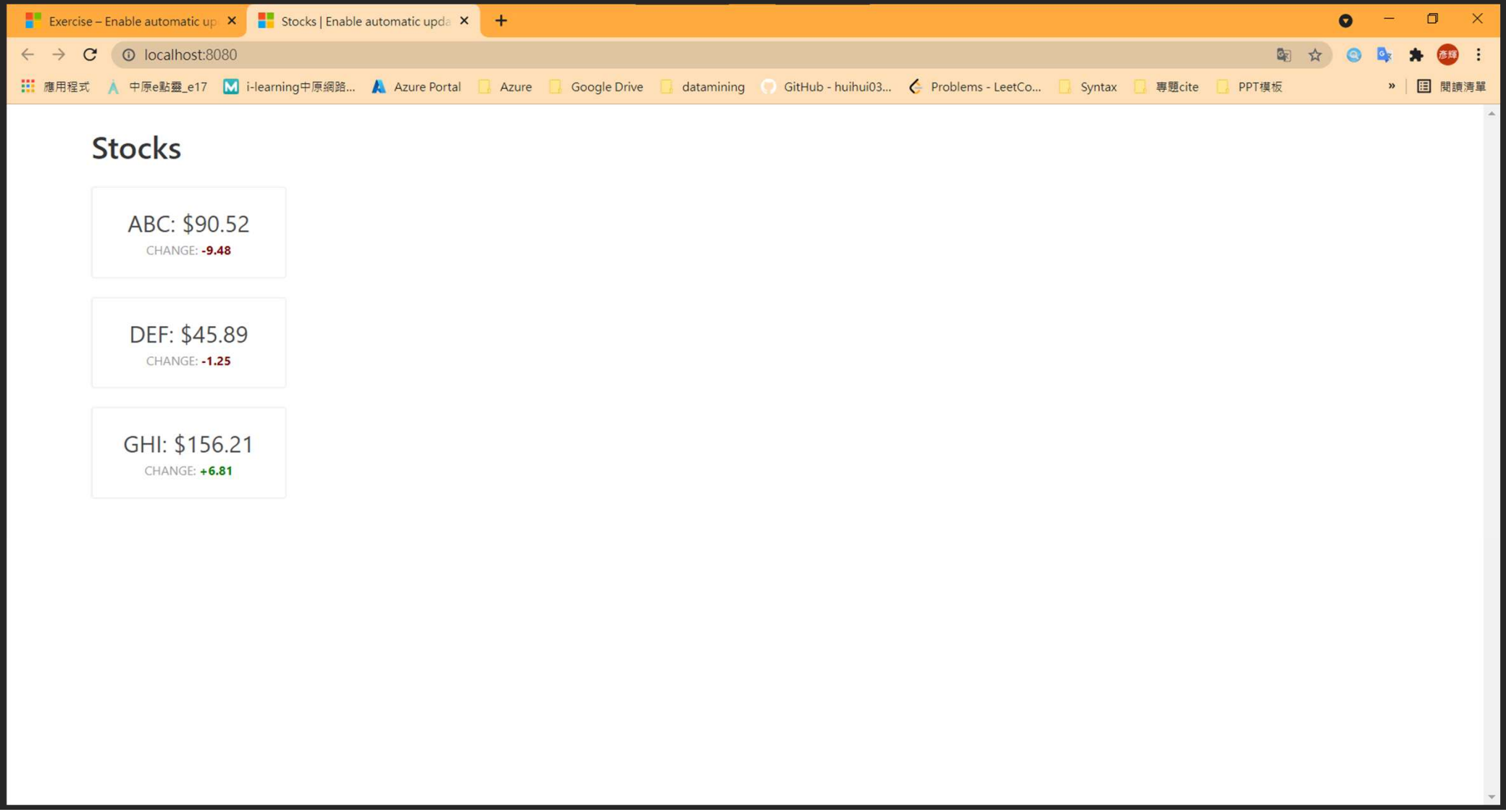
Update the web application - 1



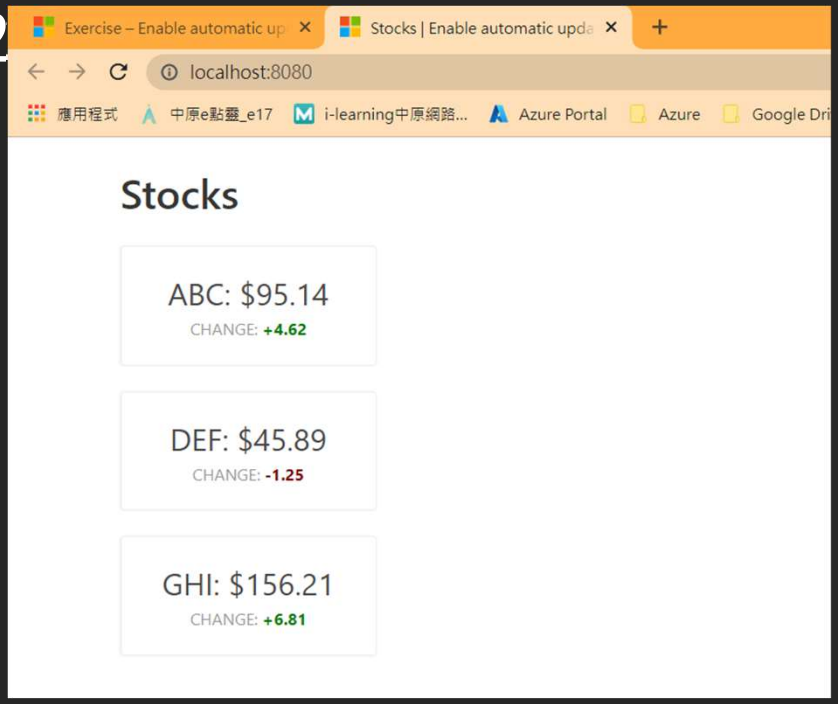
Update the web application - 2

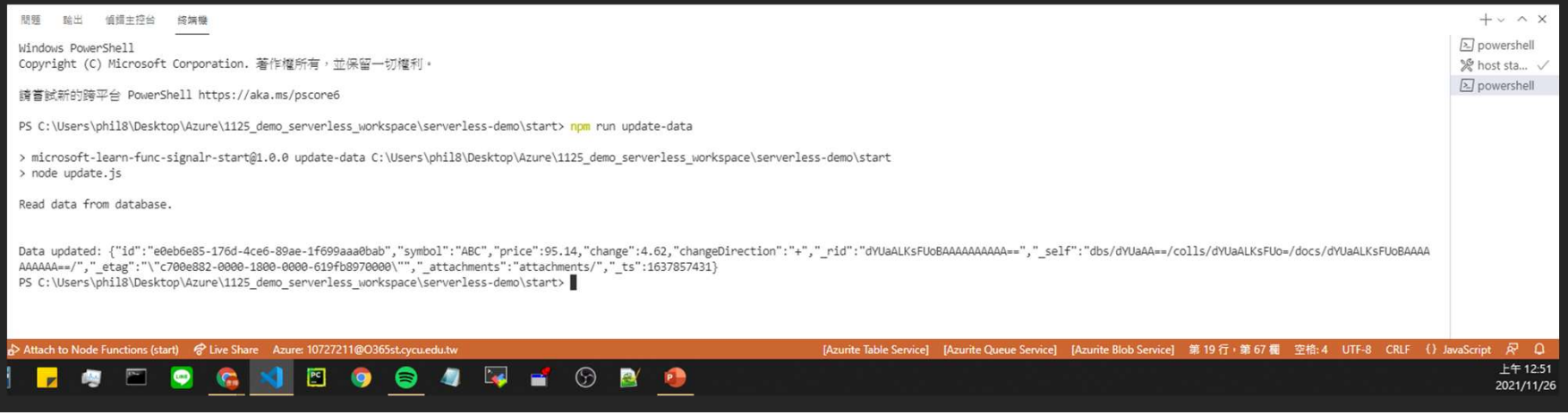


Run the application - 1



Run the application - 2

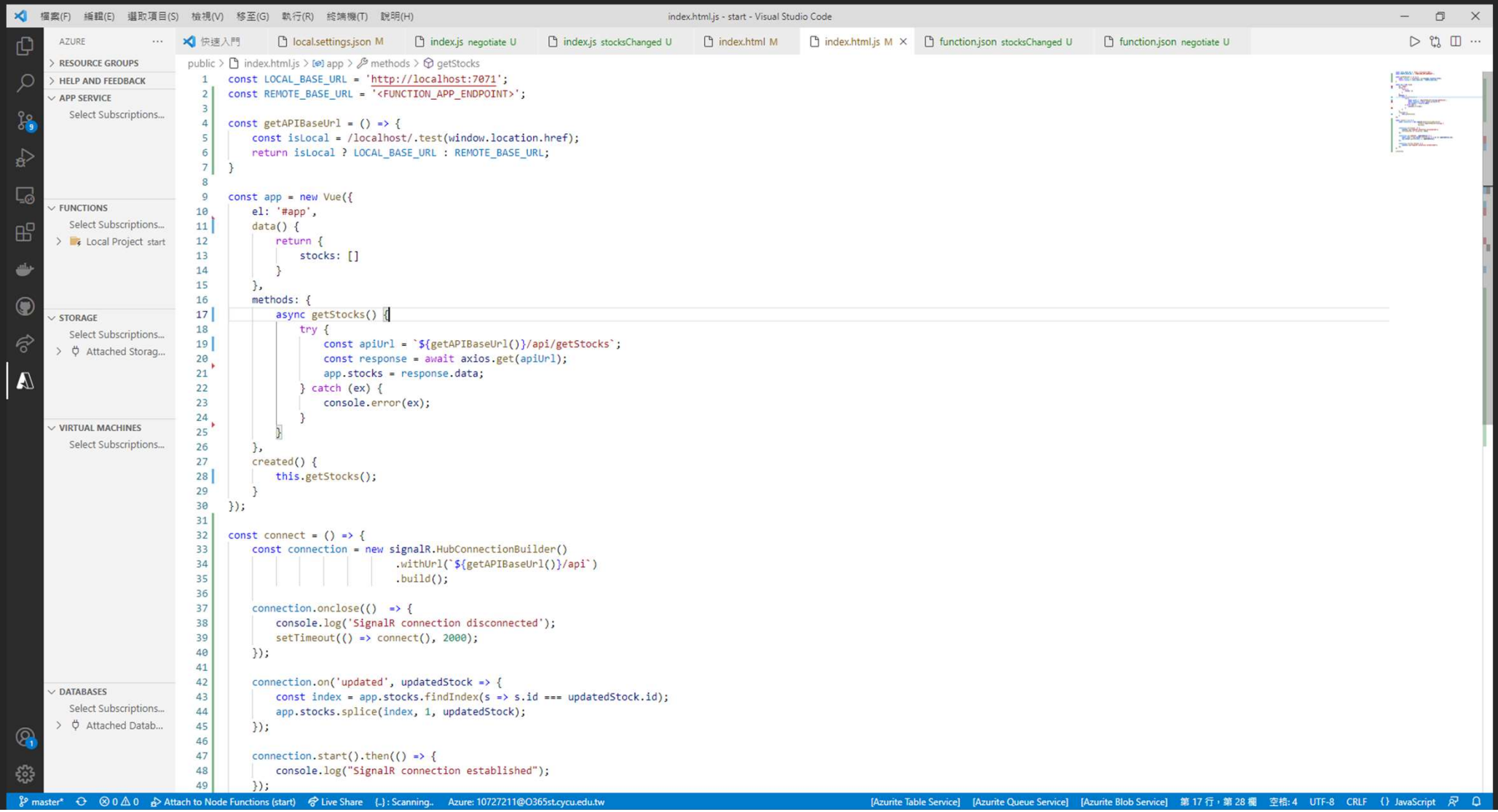




Login

F1

> Azure Sign in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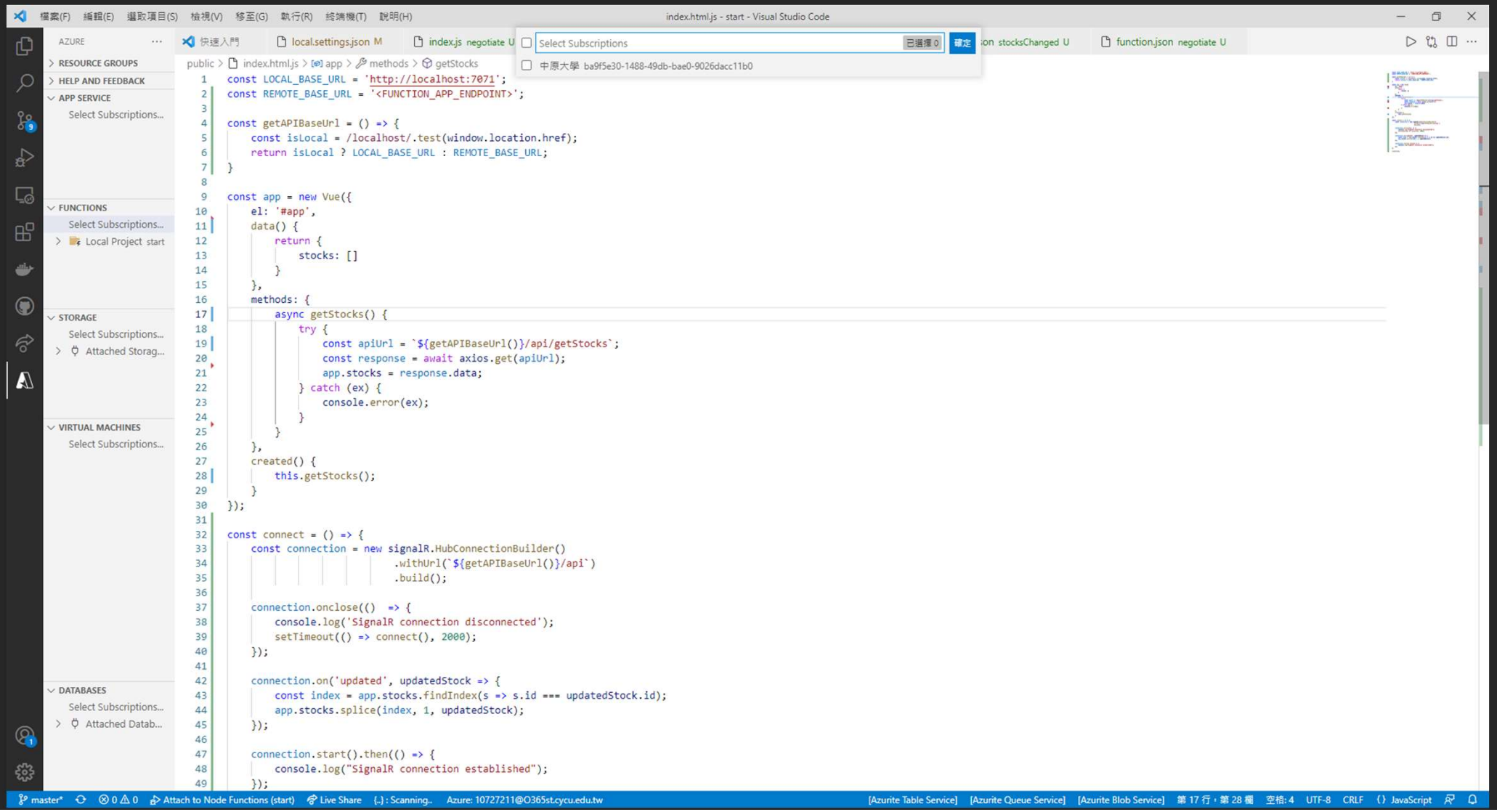
index.html.js - start - Visual Studio Code
AZURE
RESOURCE GROUPS
HELP AND FEEDBACK
APP SERVICE
Select Subscriptions...
FUNCTIONS
Select Subscriptions...
Local Project start
STORAGE
Select Subscriptions...
Attached Storag...
VIRTUAL MACHINES
Select Subscriptions...
DATABASES
Select Subscriptions...
Attached Datab...
快速入門
local.settings.json M
index.js negotiate U
index.js stocksChanged U
index.html M
index.html.js M
function.json stocksChanged U
function.json negotiate U
public > index.html.js > app > methods > getStocks
const LOCAL_BASE_URL = 'http://localhost:7071';
const REMOTE_BASE_URL = '<FUNCTION_APP_ENDPOINT>';
const getAPIBaseUrl = () => {
const isLocal = /localhost/.test(window.location.href);
return isLocal ? LOCAL_BASE_URL : REMOTE_BASE_URL;
}
const app = new Vue({
el: '#app',
data() {
return {
stocks: []
}
},
methods: {
async getStocks() {
try {
const apiUrl = `${getAPIBaseUrl()}/api/getStocks`;
const response = await axios.get(apiUrl);
app.stocks = response.data;
} catch (ex) {
console.error(ex);
}
}
},
created() {
this.getStocks();
}
});
const connect = () => {
const connection = new signalR.HubConnectionBuilder()
.withUrl(`${getAPIBaseUrl()}/api`)
.build();
connection.onclose(() => {
console.log('SignalR connection disconnected');
setTimeout(() => connect(), 2000);
});
connection.on('updated', updatedStock => {
const index = app.stocks.findIndex(s => s.id === updatedStock.id);
app.stocks.splice(index, 1, updatedStock);
});
connection.start().then(() => {
console.log("SignalR connection established");
});
master*
Attach to Node Functions (start)
Live Share
{..}: Scanning..
Azure: 10727211@O365st.cycu.edu.tw
[Azurite Table Service]
[Azurite Queue Service]
[Azurite Blob Service]
第 17 行，第 28 欄
空格: 4
UTF-8
CRLF
JavaScript

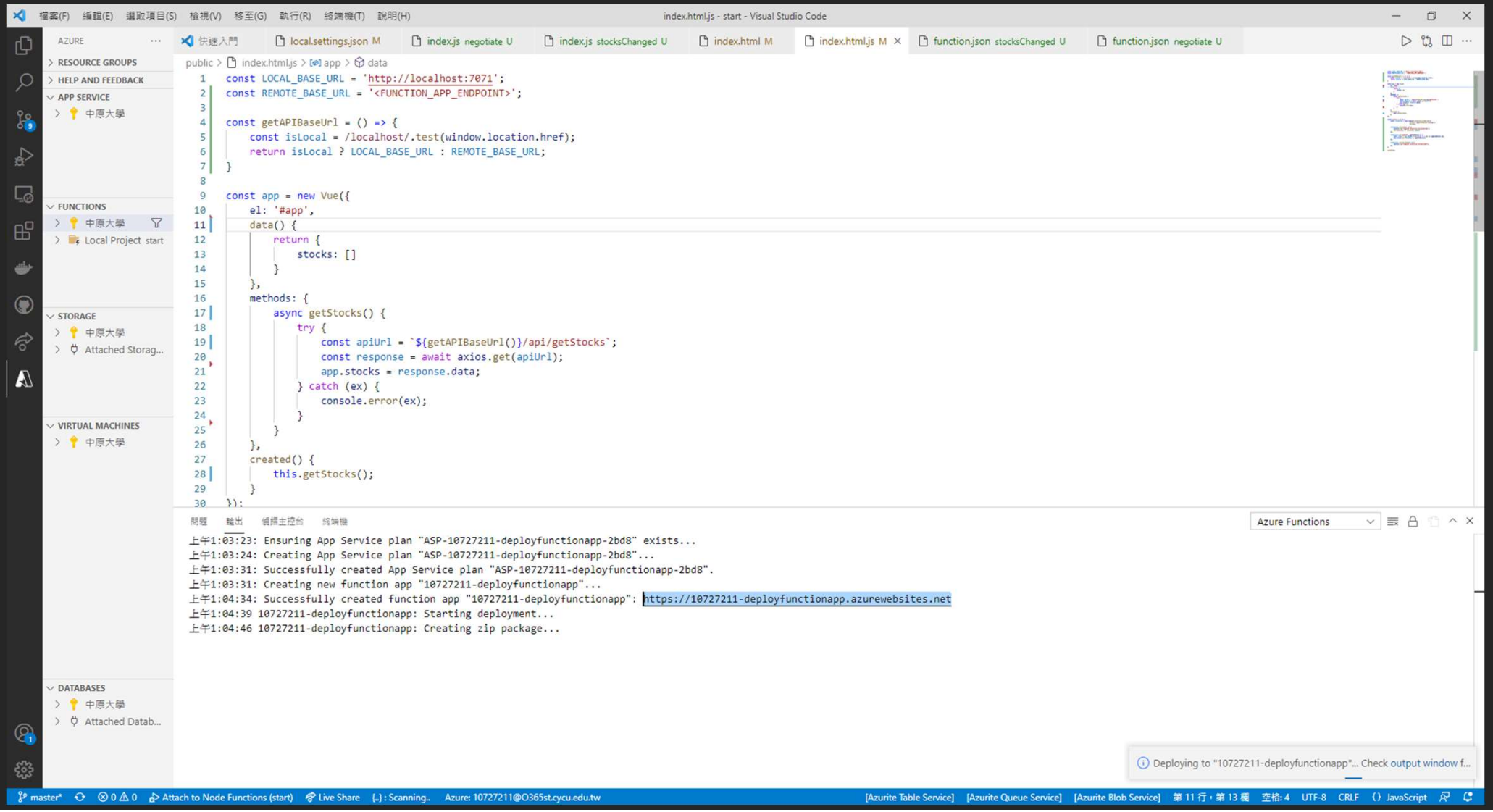
Select Subscriptions



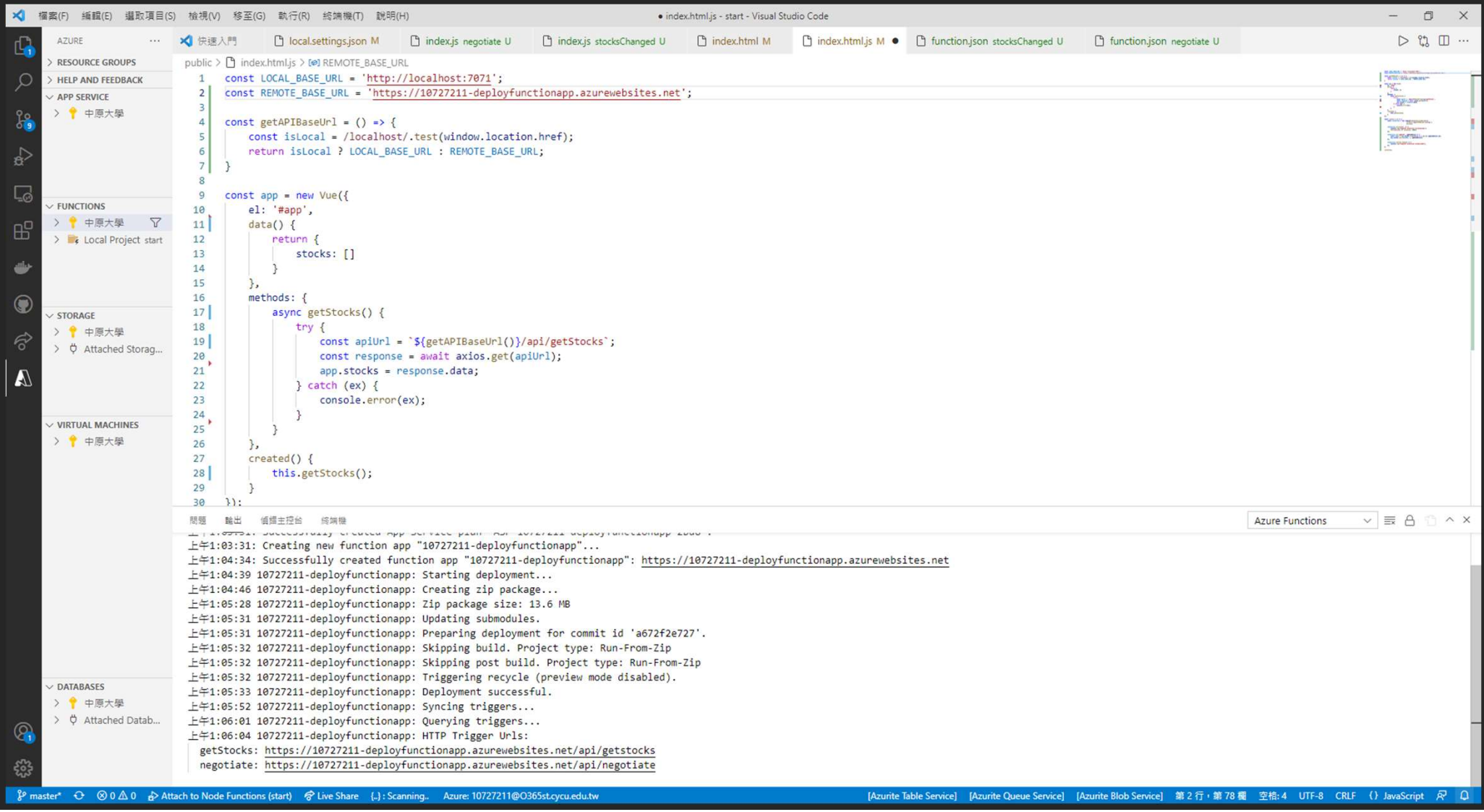
Deploy the function app - 1

	Azure Functions: Deploy to Function App
Template	Create new Function App in Azure... Advanced
Name	10727211-deployfunctionapp
Running Stack	Node.js 8 LTS
Resource Group	110-1-CS456L
Location for new resource	東南亞 (for CS456L)
Hosting Plan	Consumption
storage	10727211model9storage
Application Insights resource	Skip for now

Deploy the function app - 2

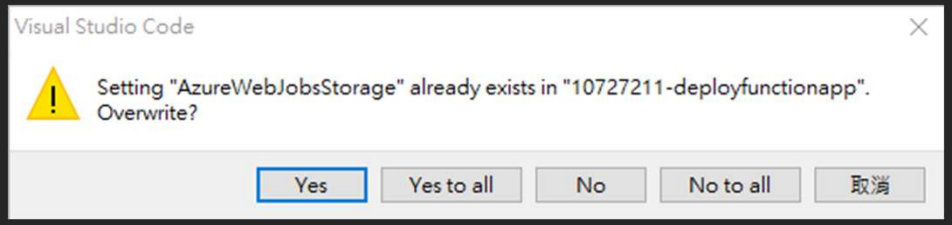


Deploy the function app - 3



Deploy the function app - 4

	Azure Functions: Upload local settings
Function App in Azure	10727211-deployfunctionapp

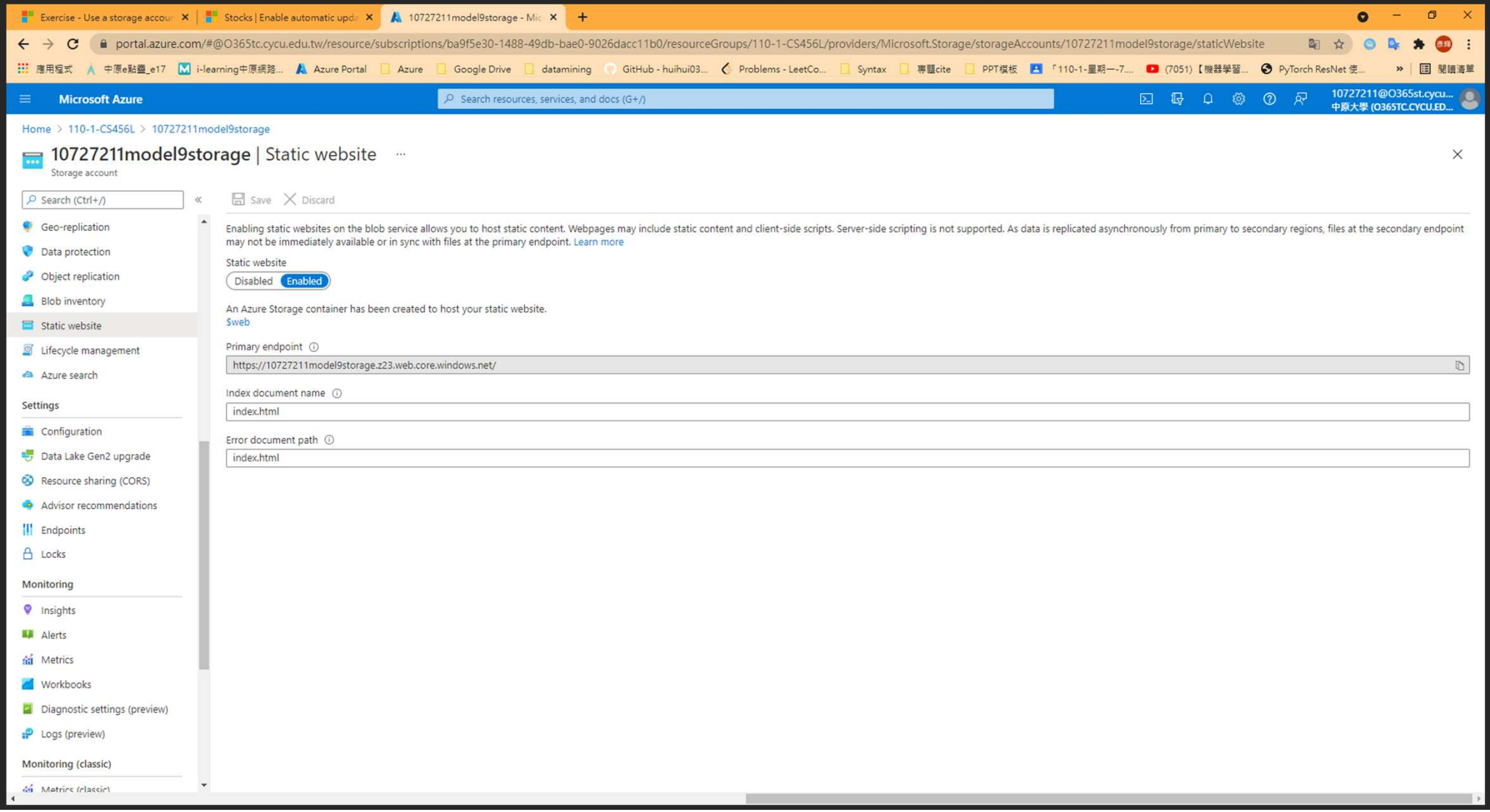


Configure static websites in Azure Storage && Deploy the web application to Azure Storage

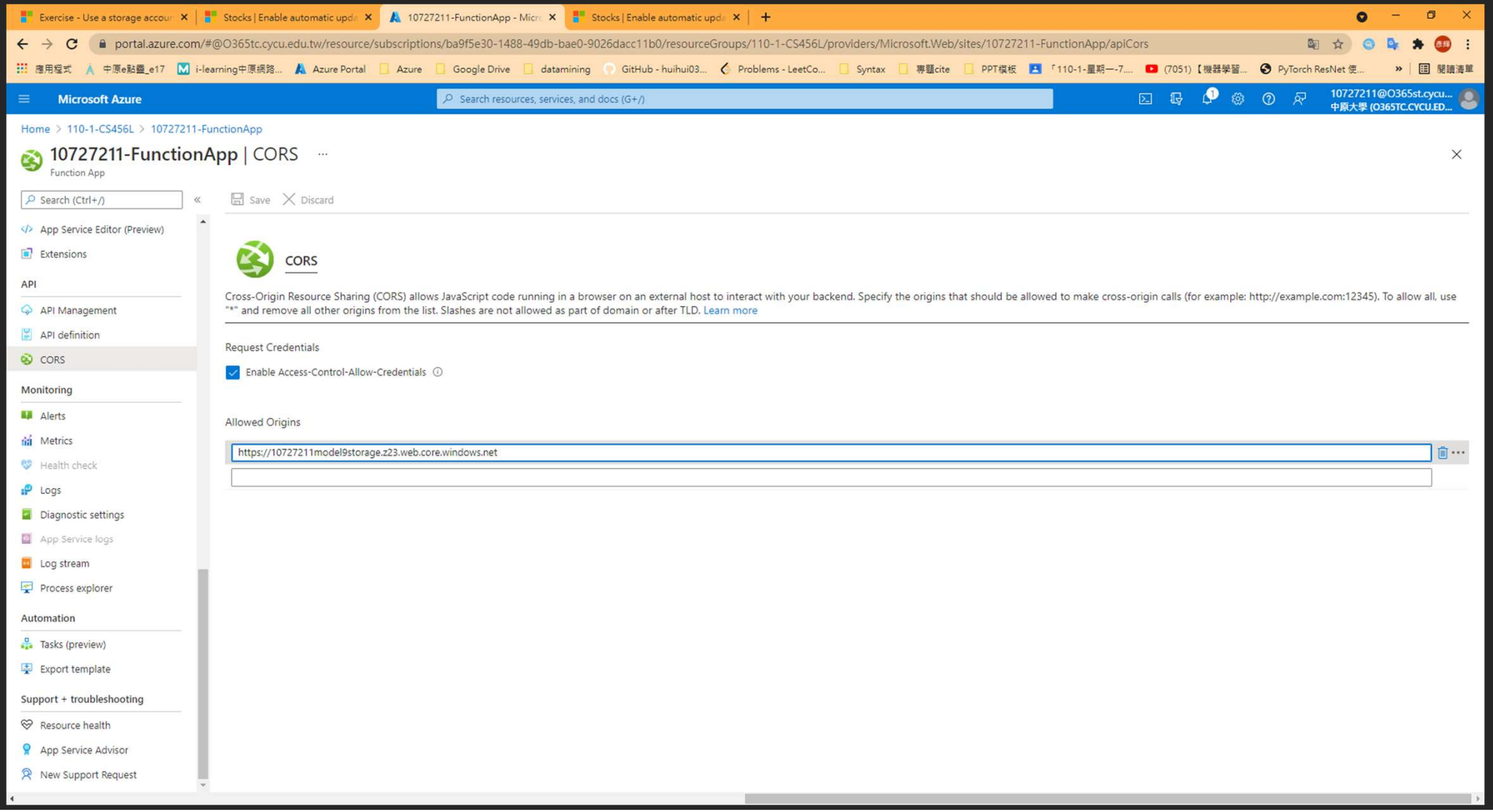
	Azure Storage: Configure Static Website
Storage account	10727211model9storage
Default file	Index.html
Error document	Index.html

	Azure Storage: Deploy to static website via Azure Storage
Storage account	10727211model9storage
Select the folder to deploy	Select **browse** and choose the *public* subfolder containing the web app.

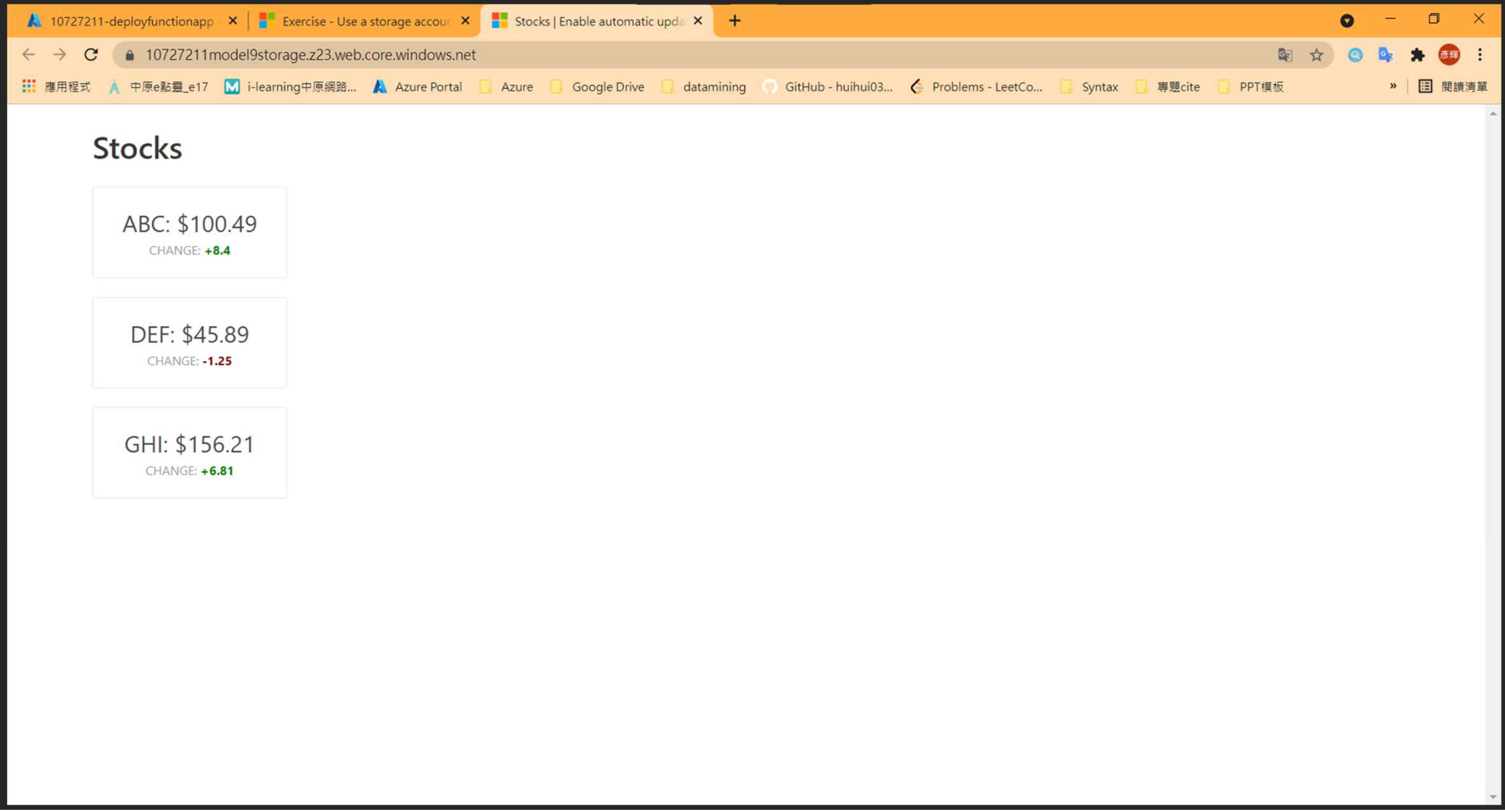
Set up CORS in the function app - 1



Set up CORS in the function app - 2

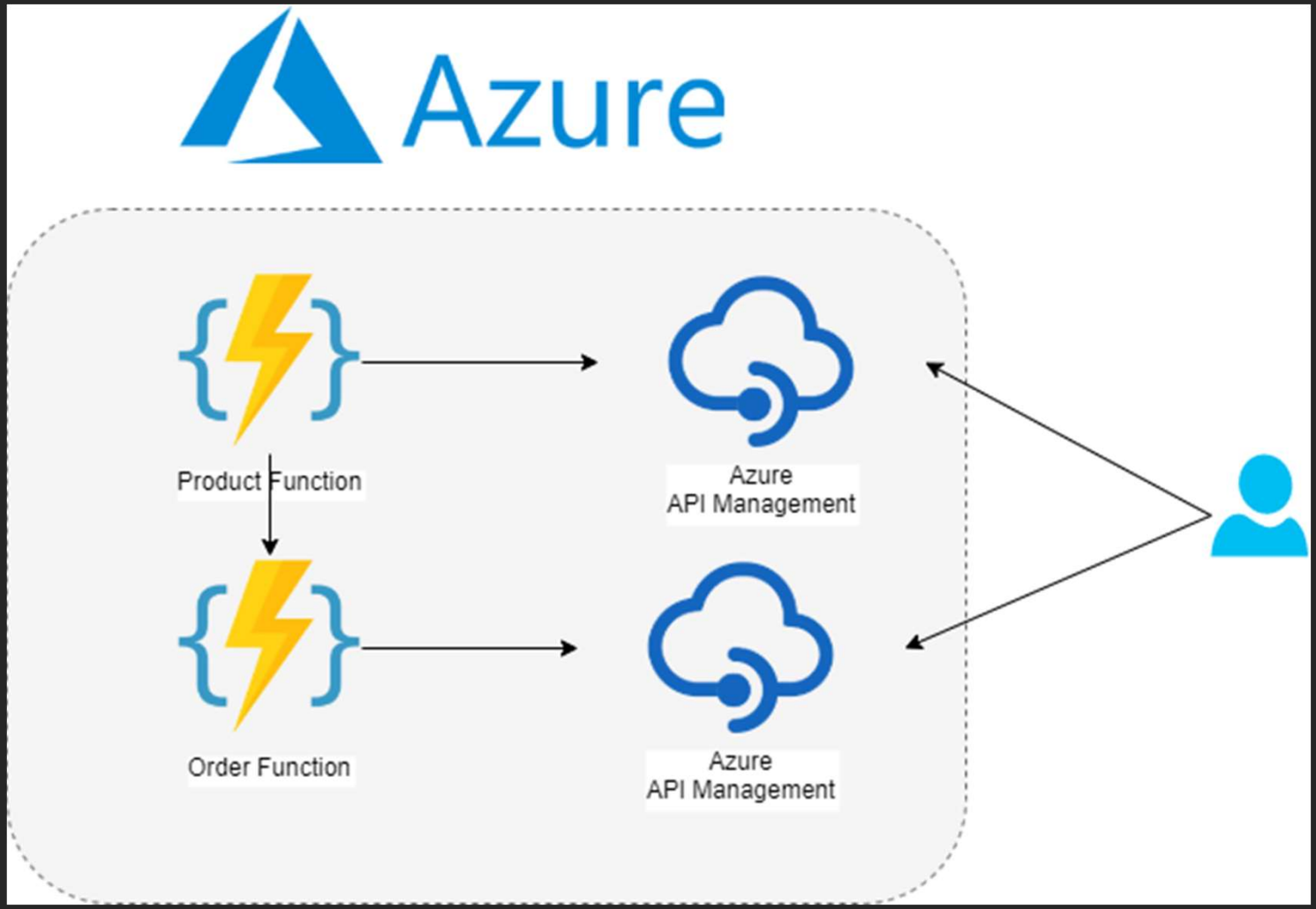


Run the deployed application



10 Expose multiple Azure Function apps as a consistent API by using Azure API Management

Abstract


Azure
Product Function
Order Function
Azure
API Management
Azure
API Management

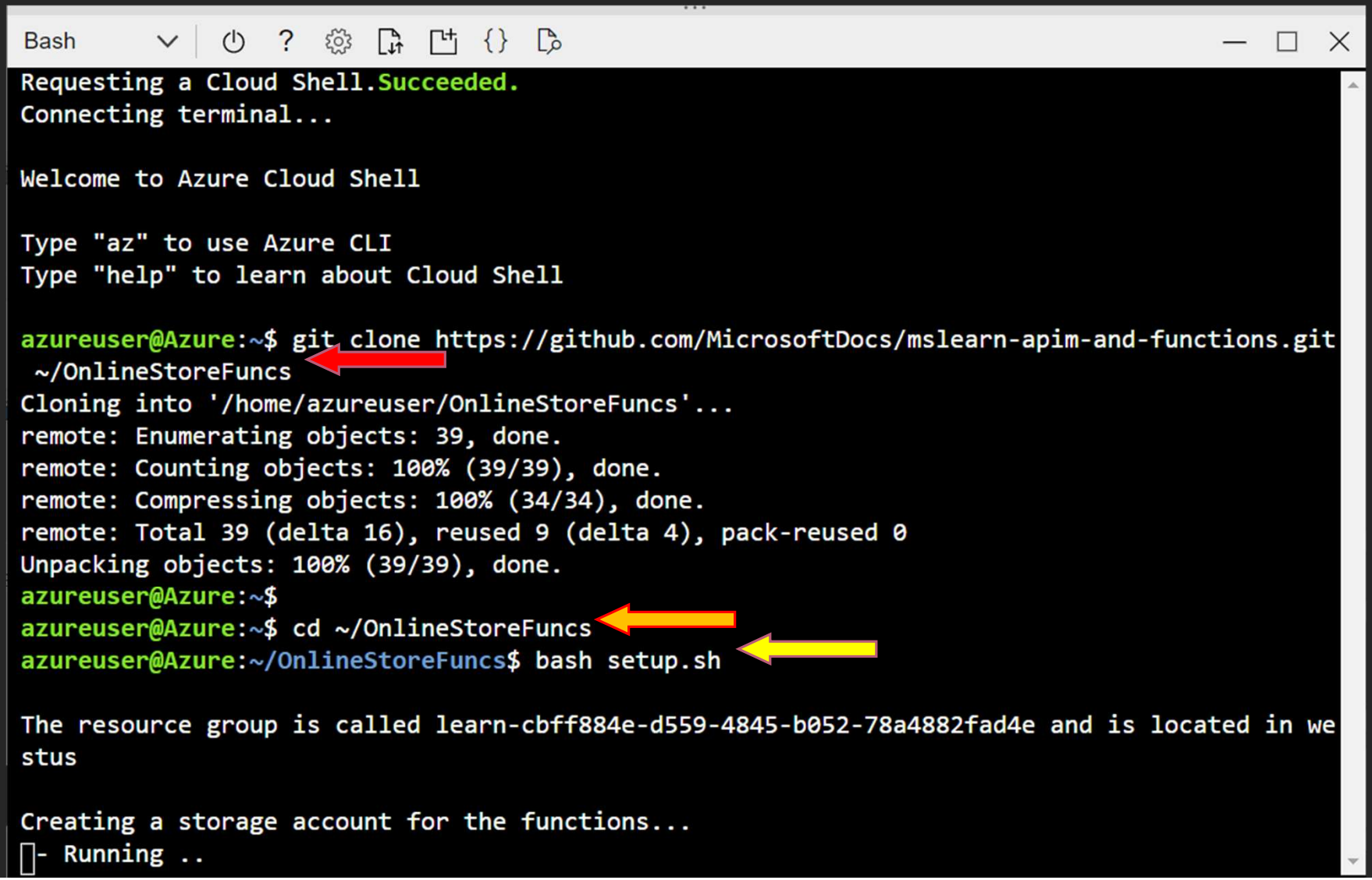
Environment

Sandbox recommend

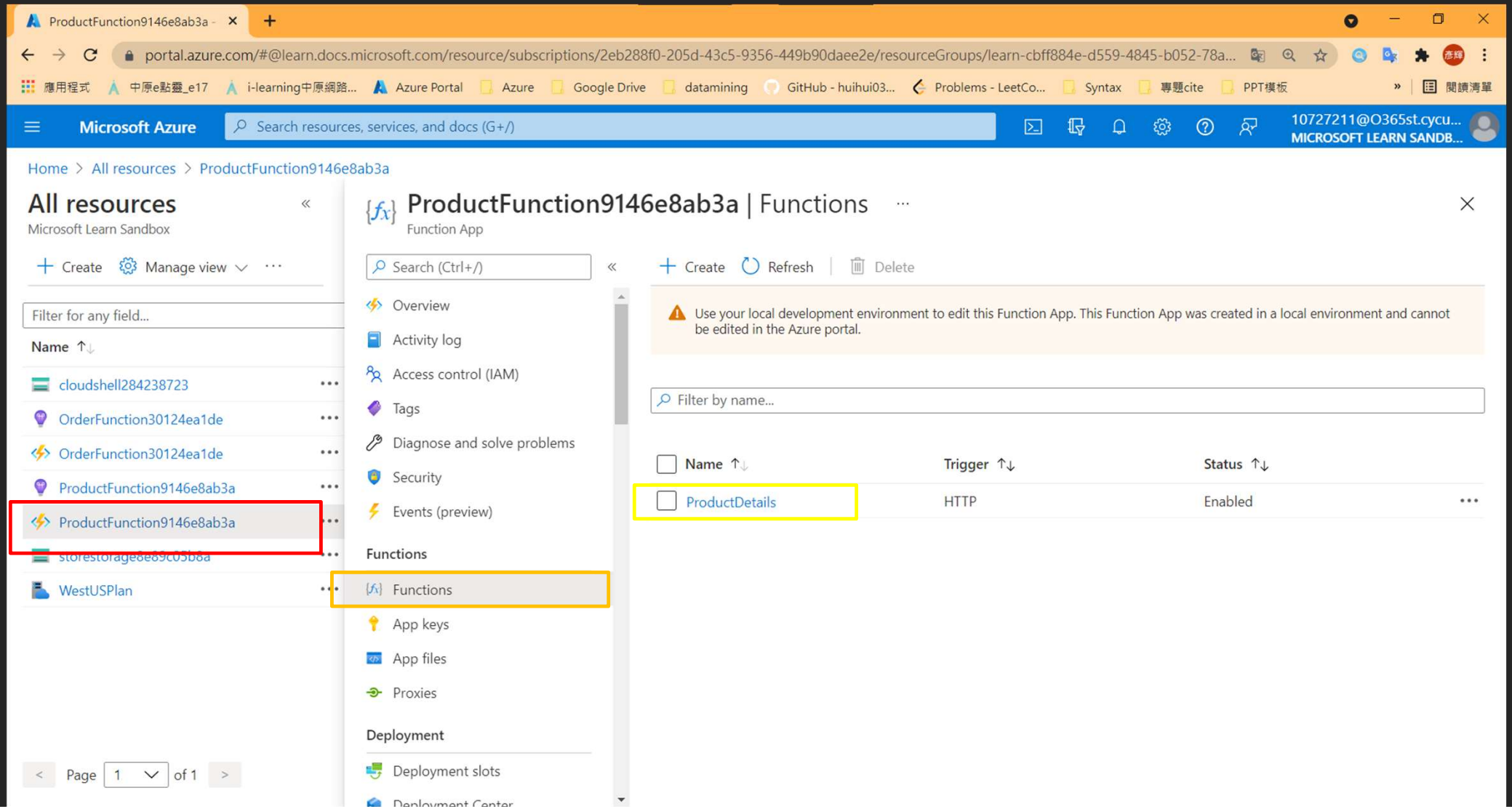
官方提供腳本 Create Resource時，名稱會是random (管理不易)

網址：https://docs.microsoft.com/en-us/learn/modules/build-serverless-api-with-functions-api-management/3-exercise-import-function-app-api-management

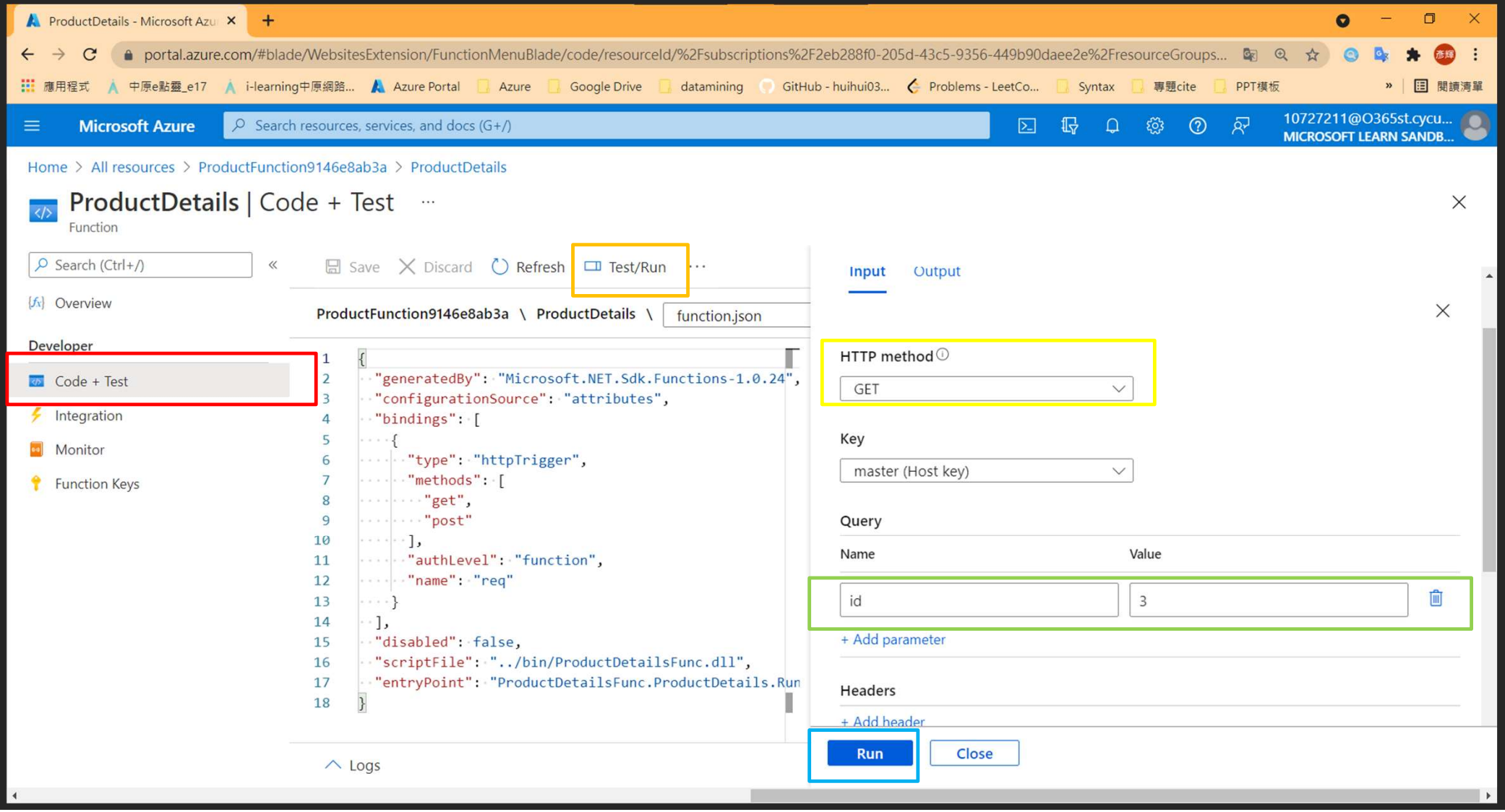
Create functions - 1



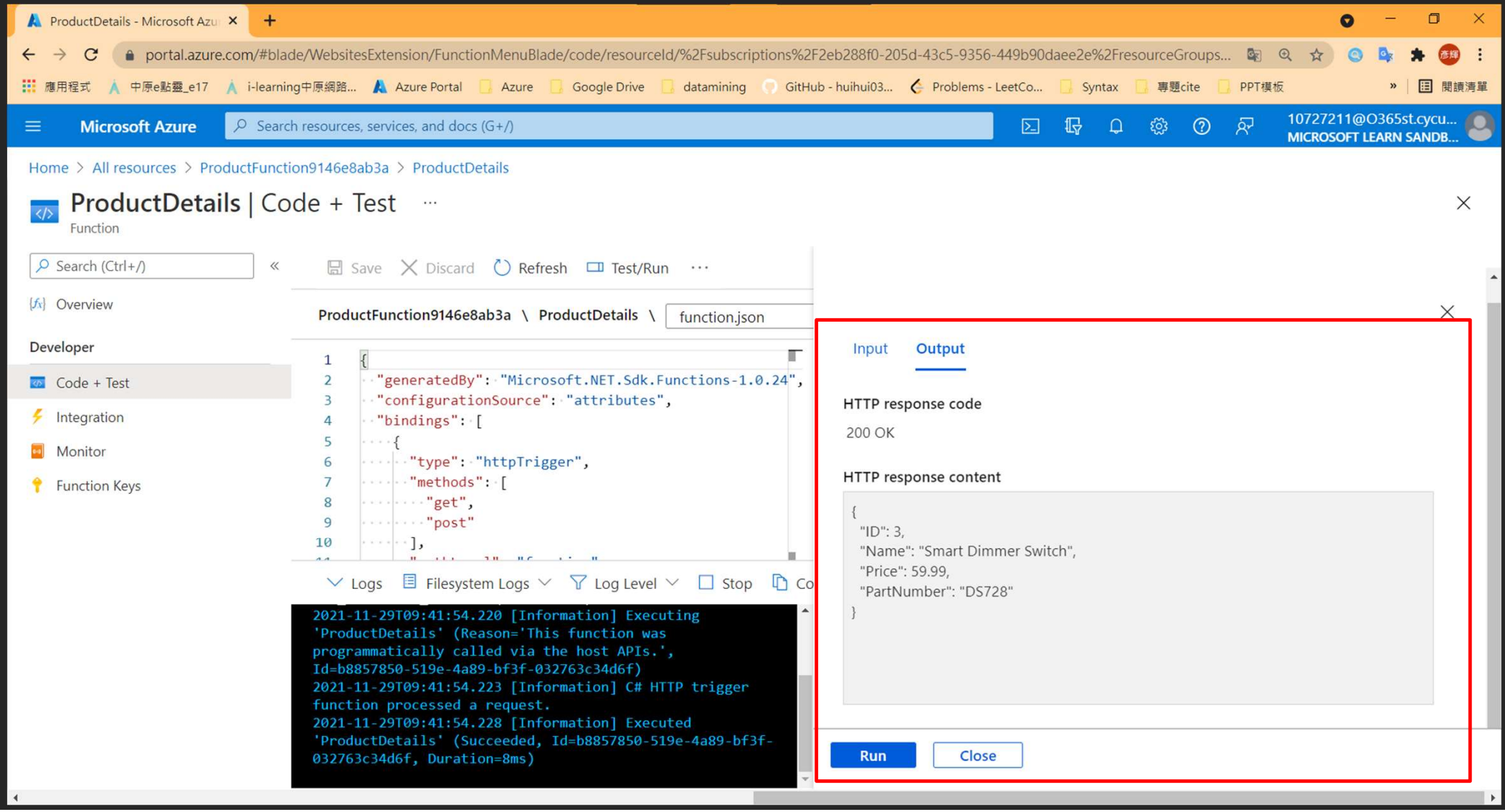
Test the product details function - 1



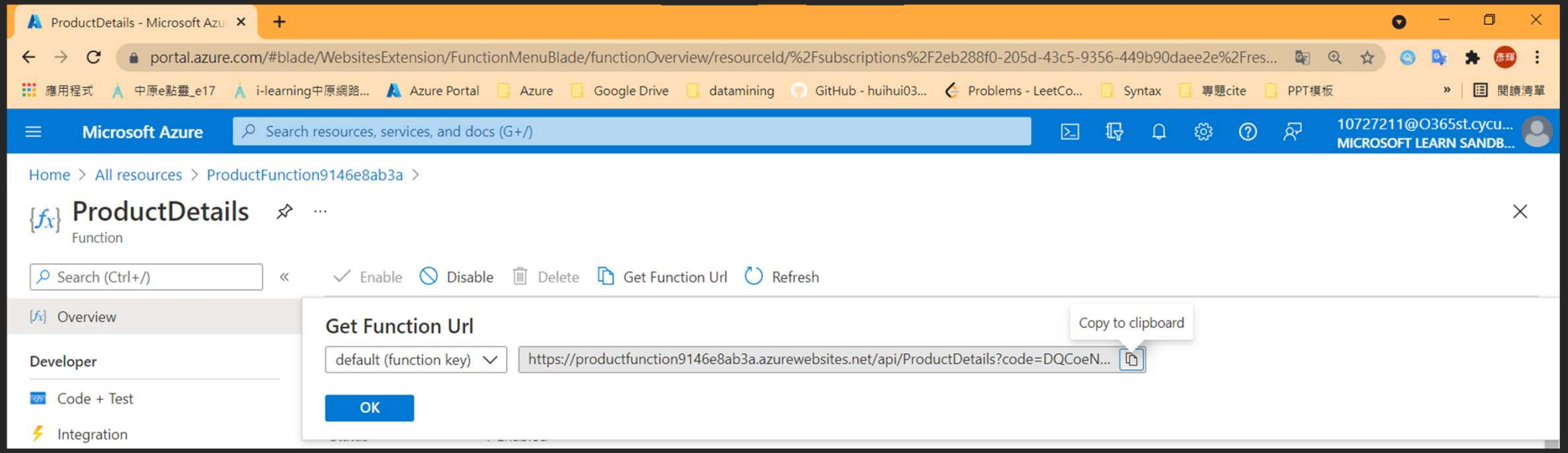
Test the product details function - 2

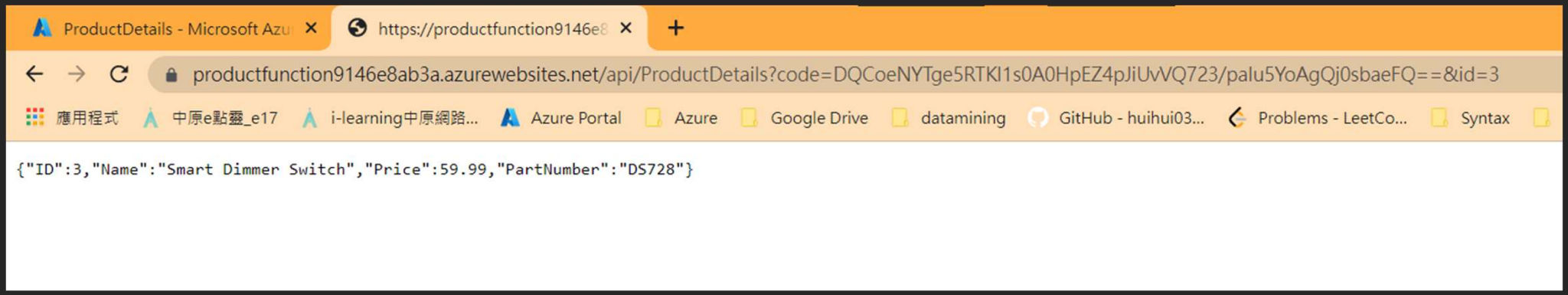


Test the product details function - 3

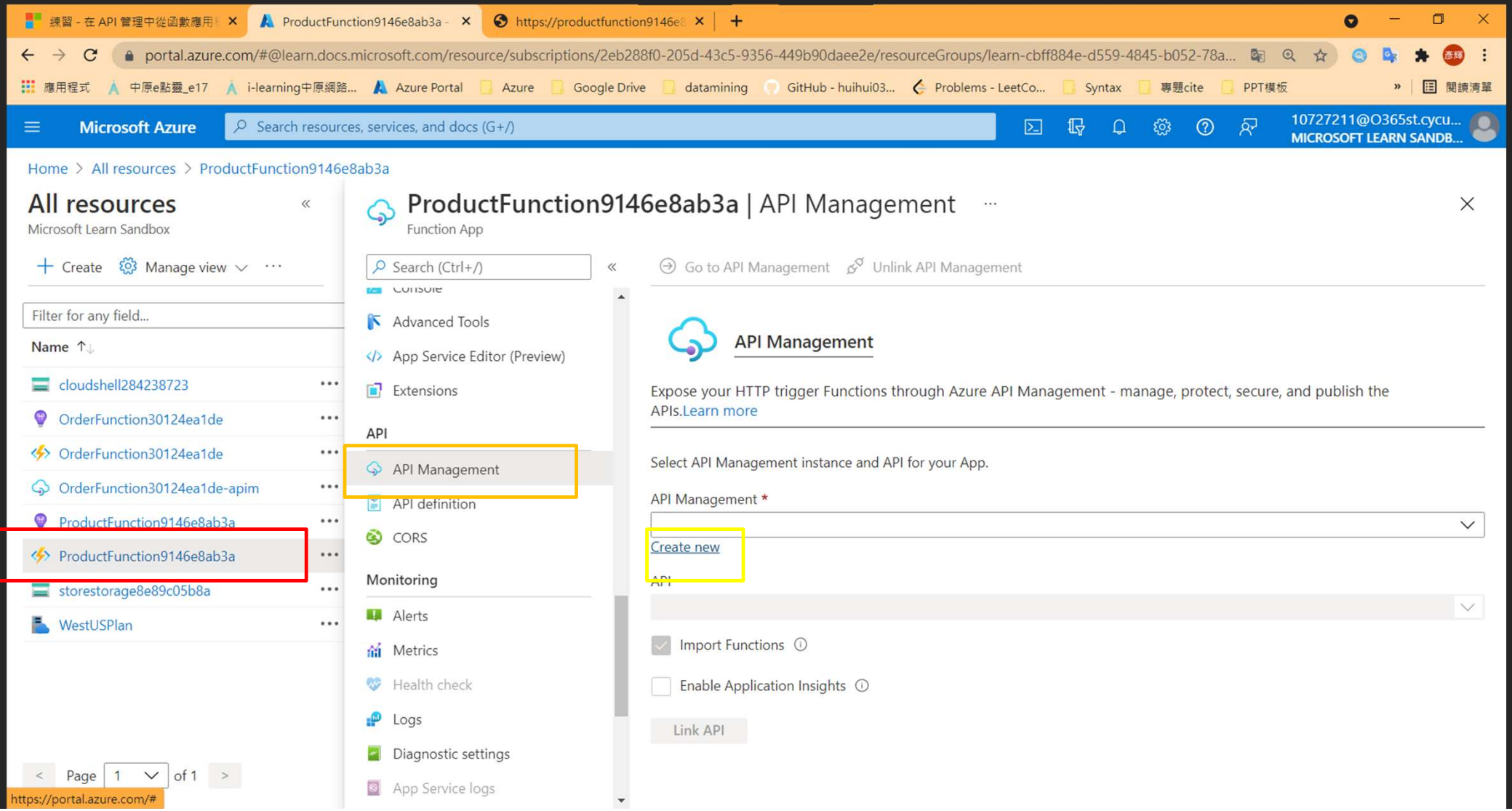


Test the product details function - 4

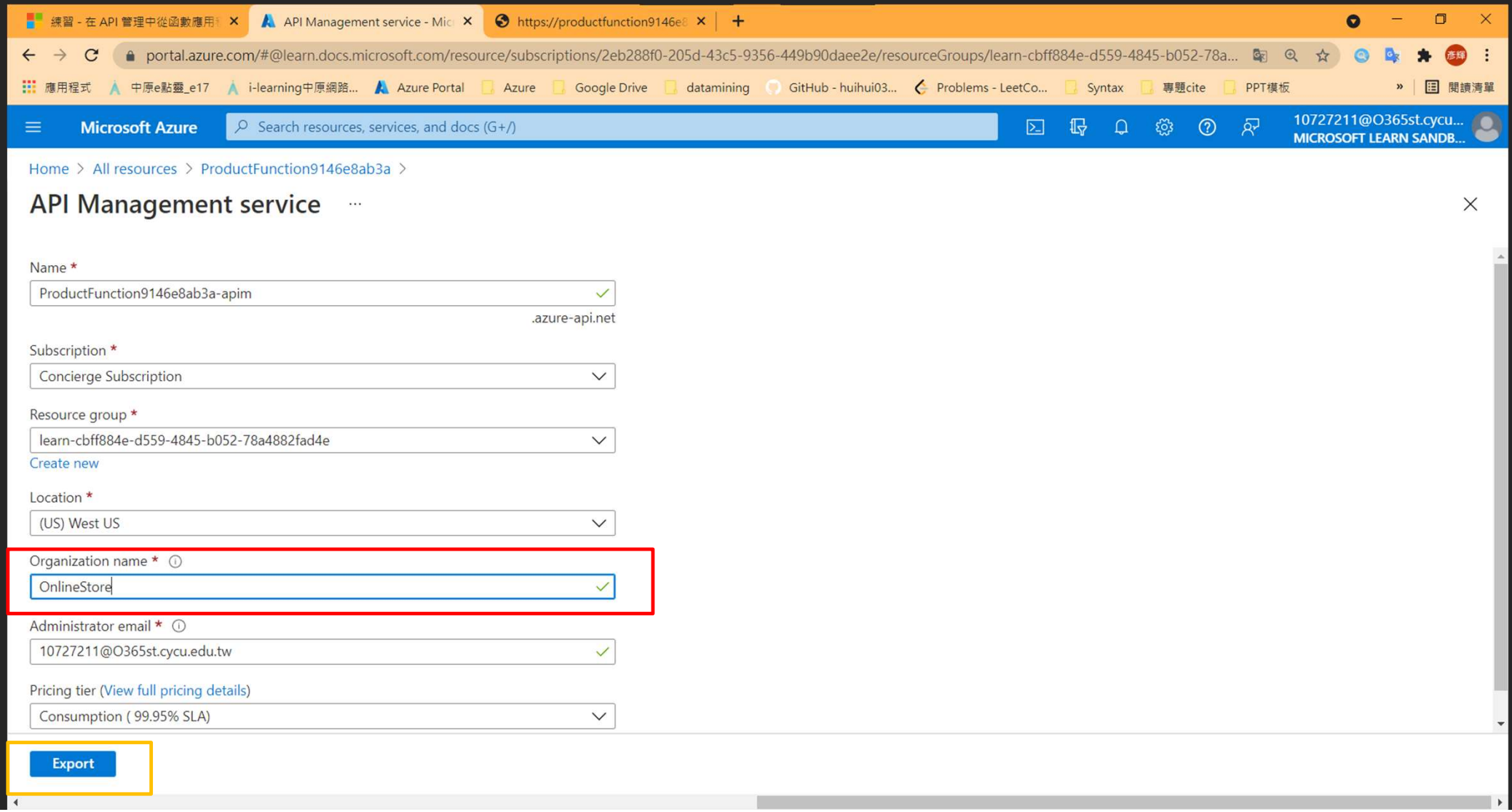




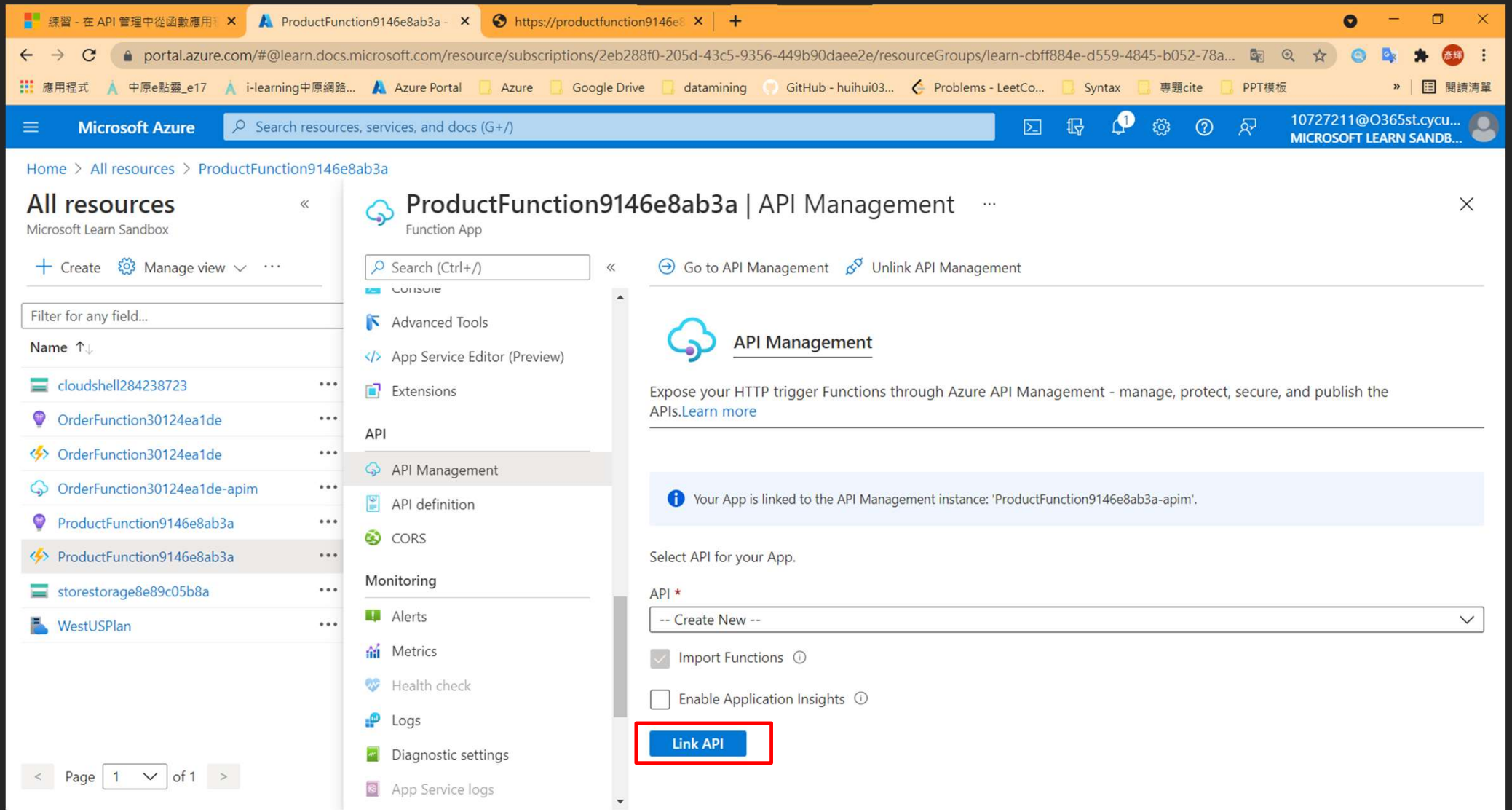
Expose function app as an API using Azure API Management - 1



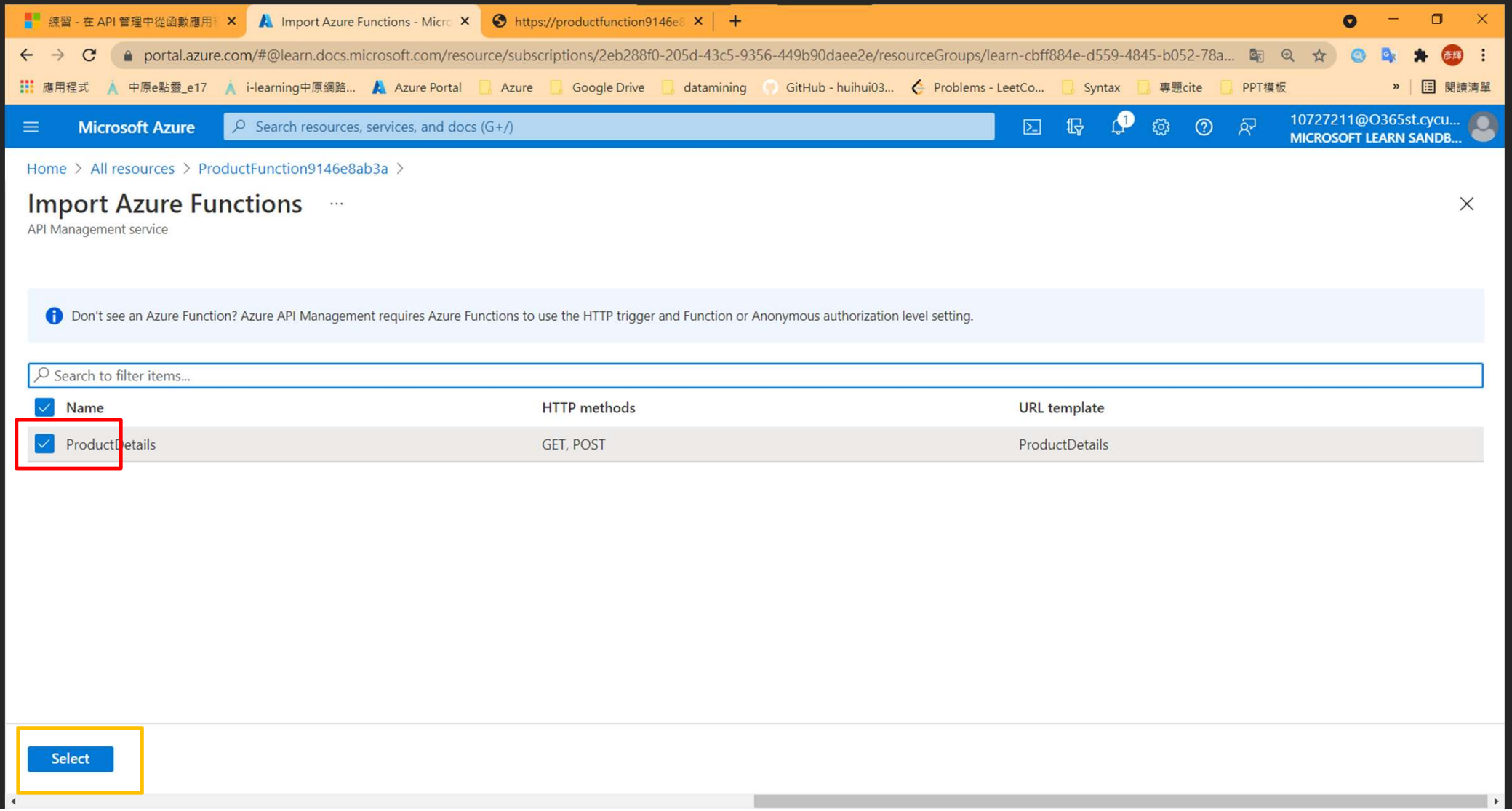
Expose function app as an API using Azure API Management - 2



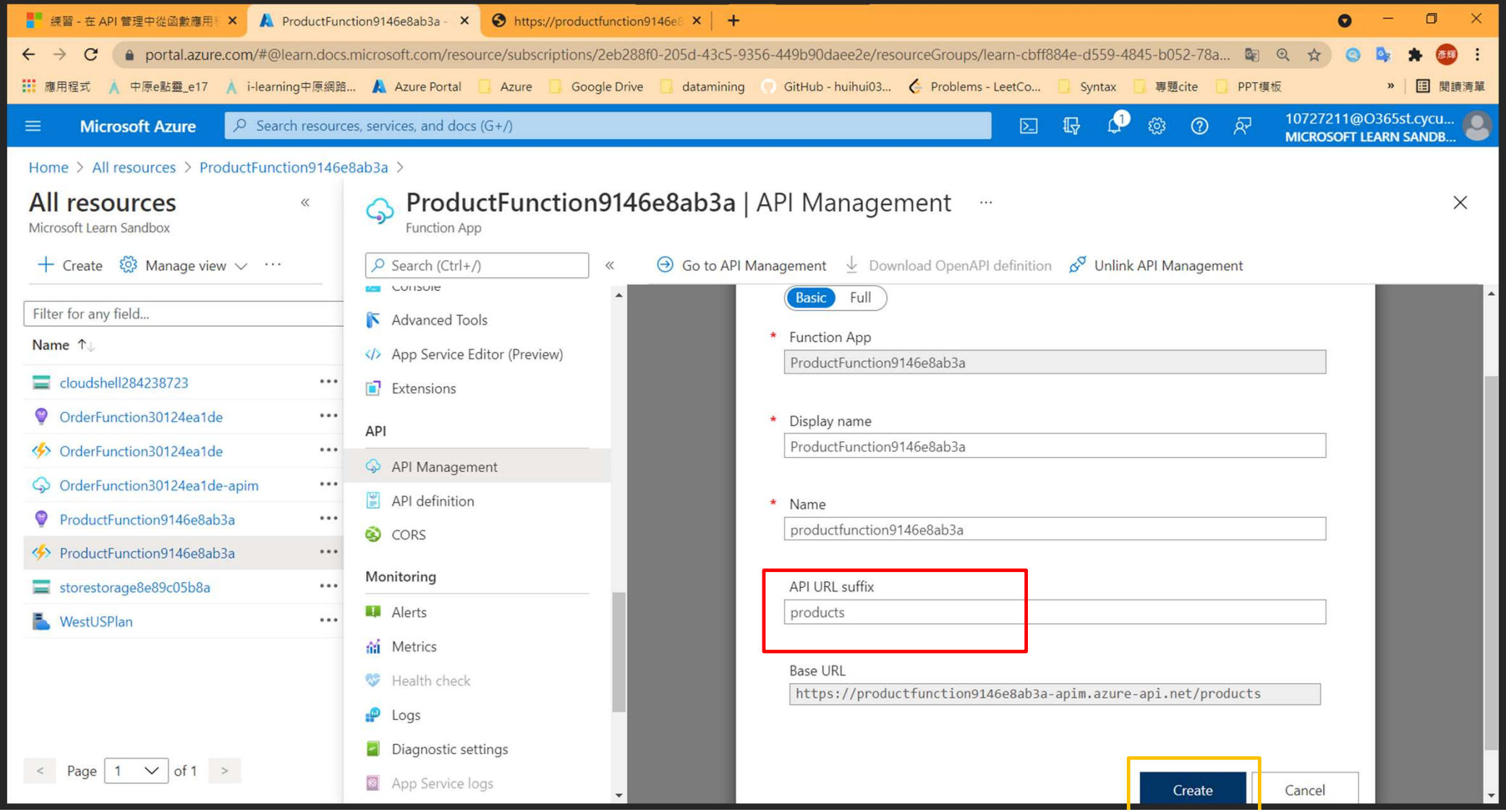
Expose function app as an API using Azure API Management - 3



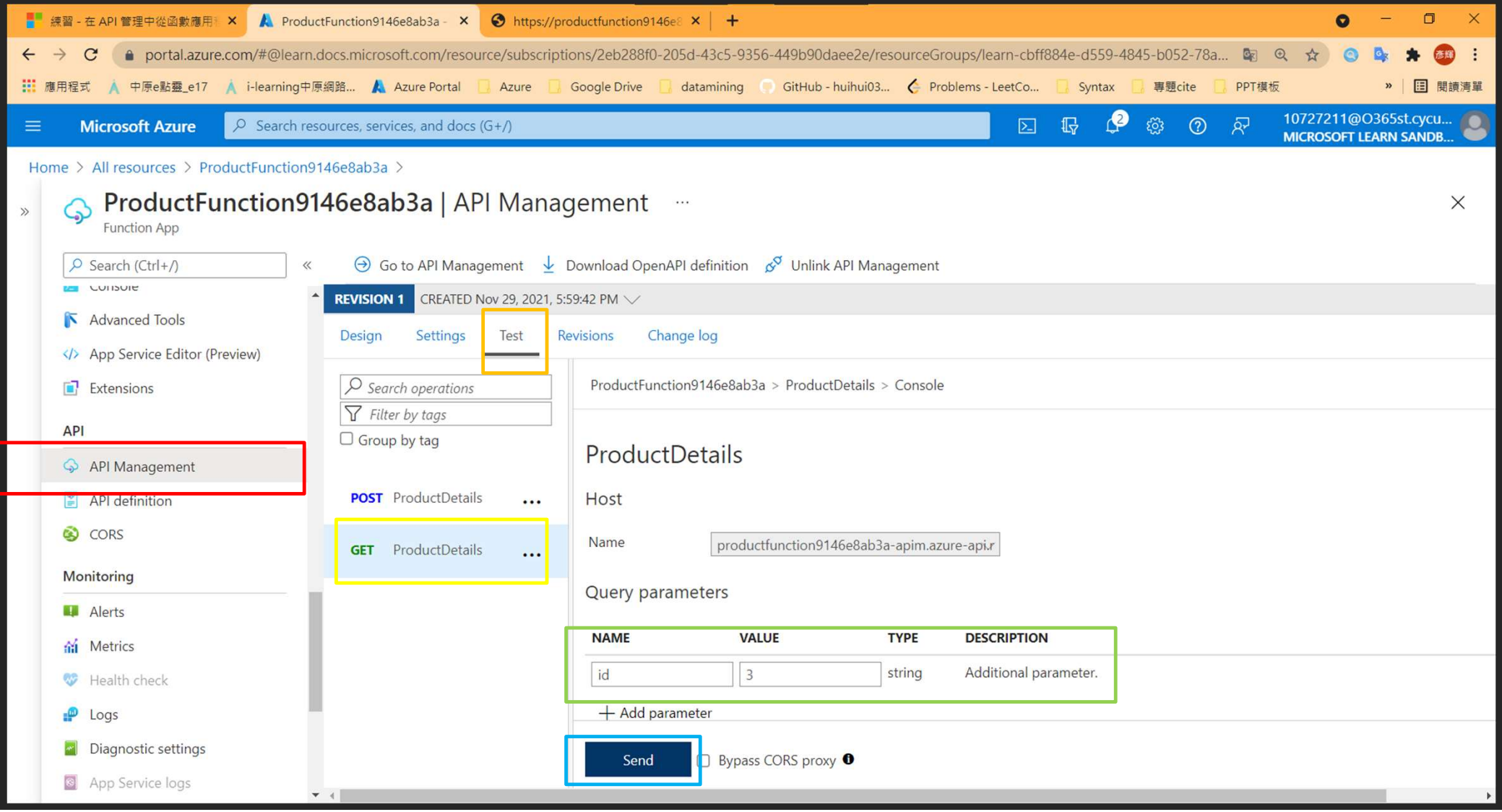
Expose function app as an API using Azure API Management - 4



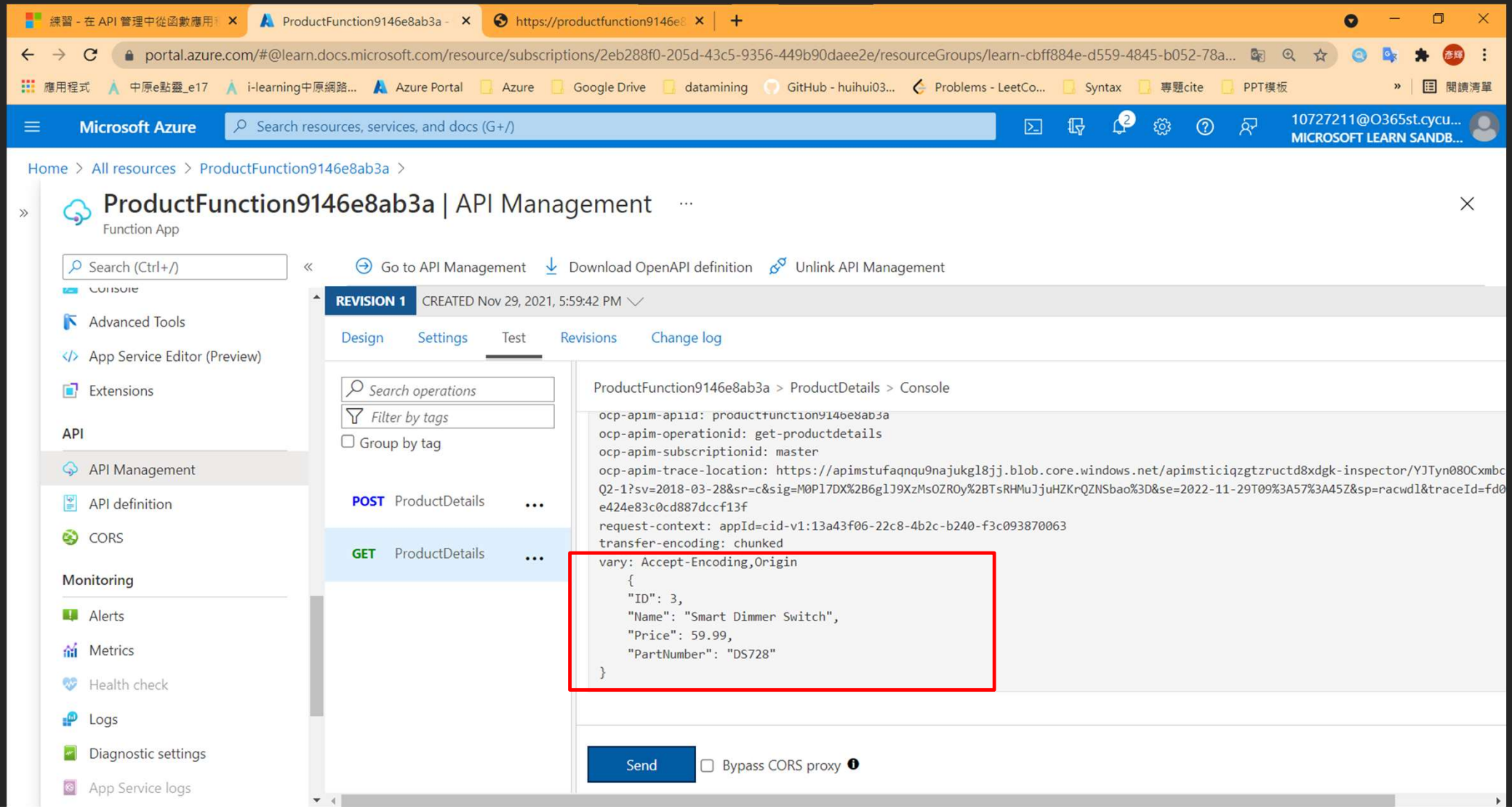
Expose function app as an API using Azure API Management - 5



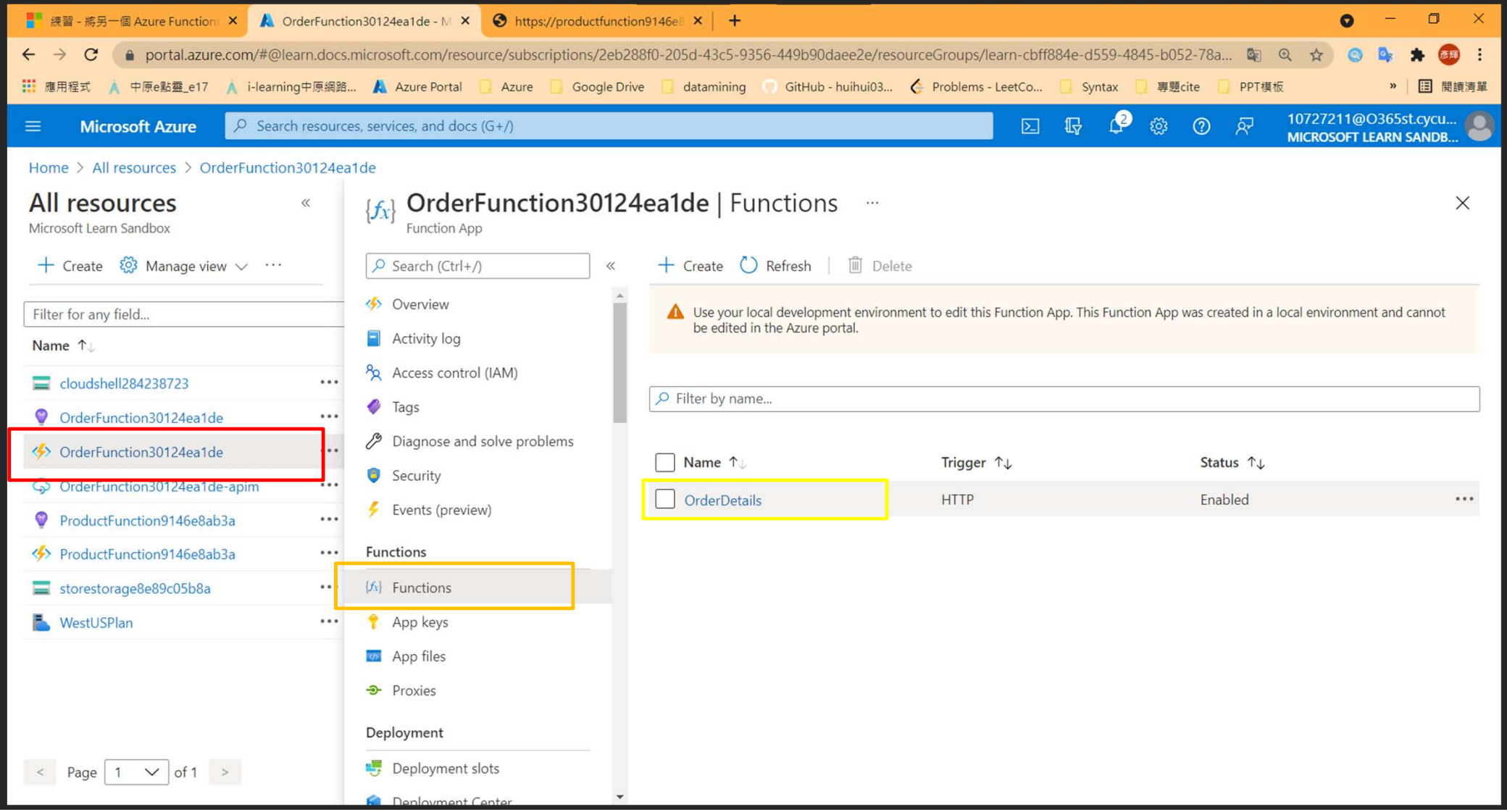
Test the OnlineStore products endpoint - 1



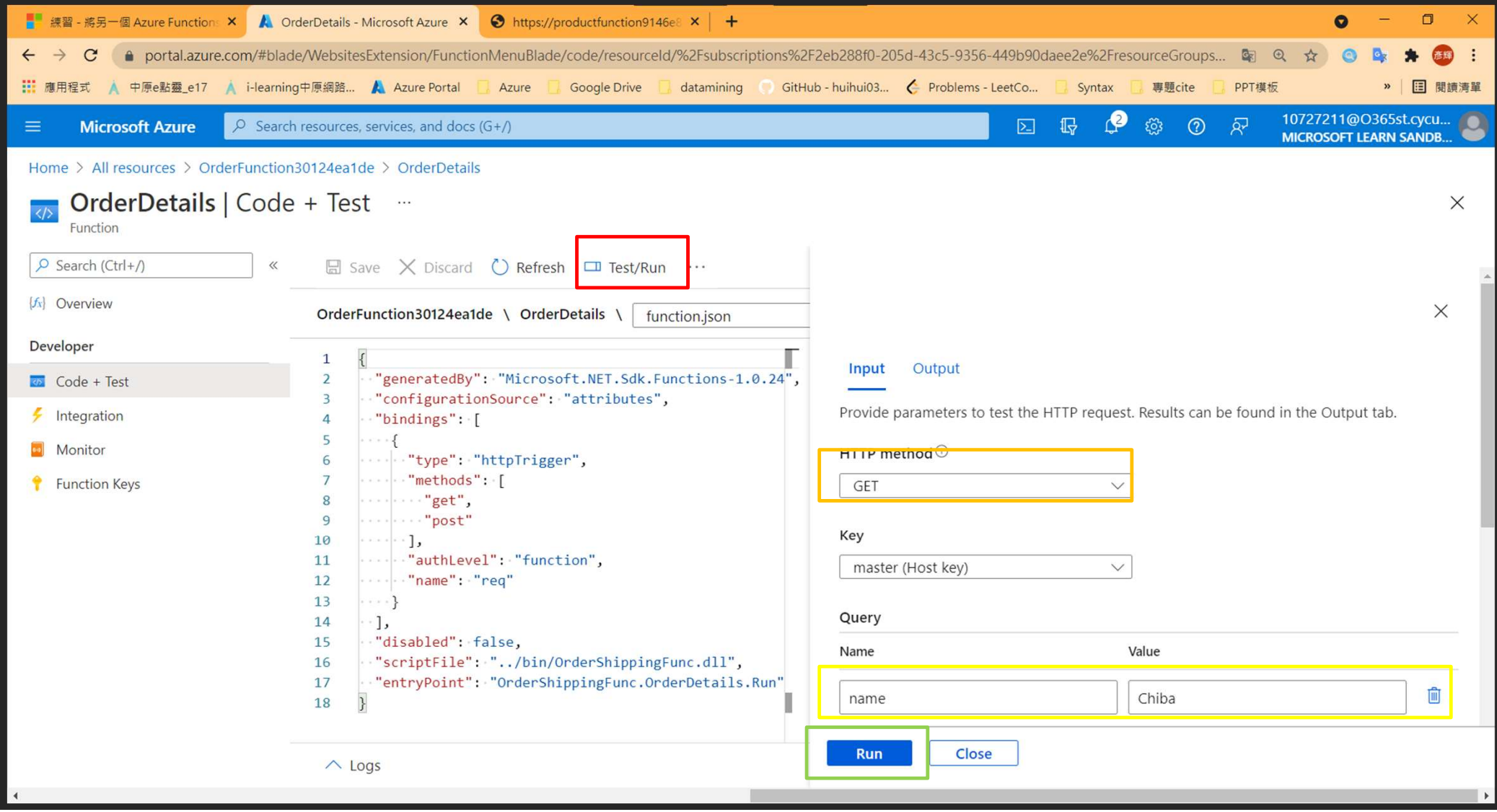
Test the OnlineStore products endpoint - 2



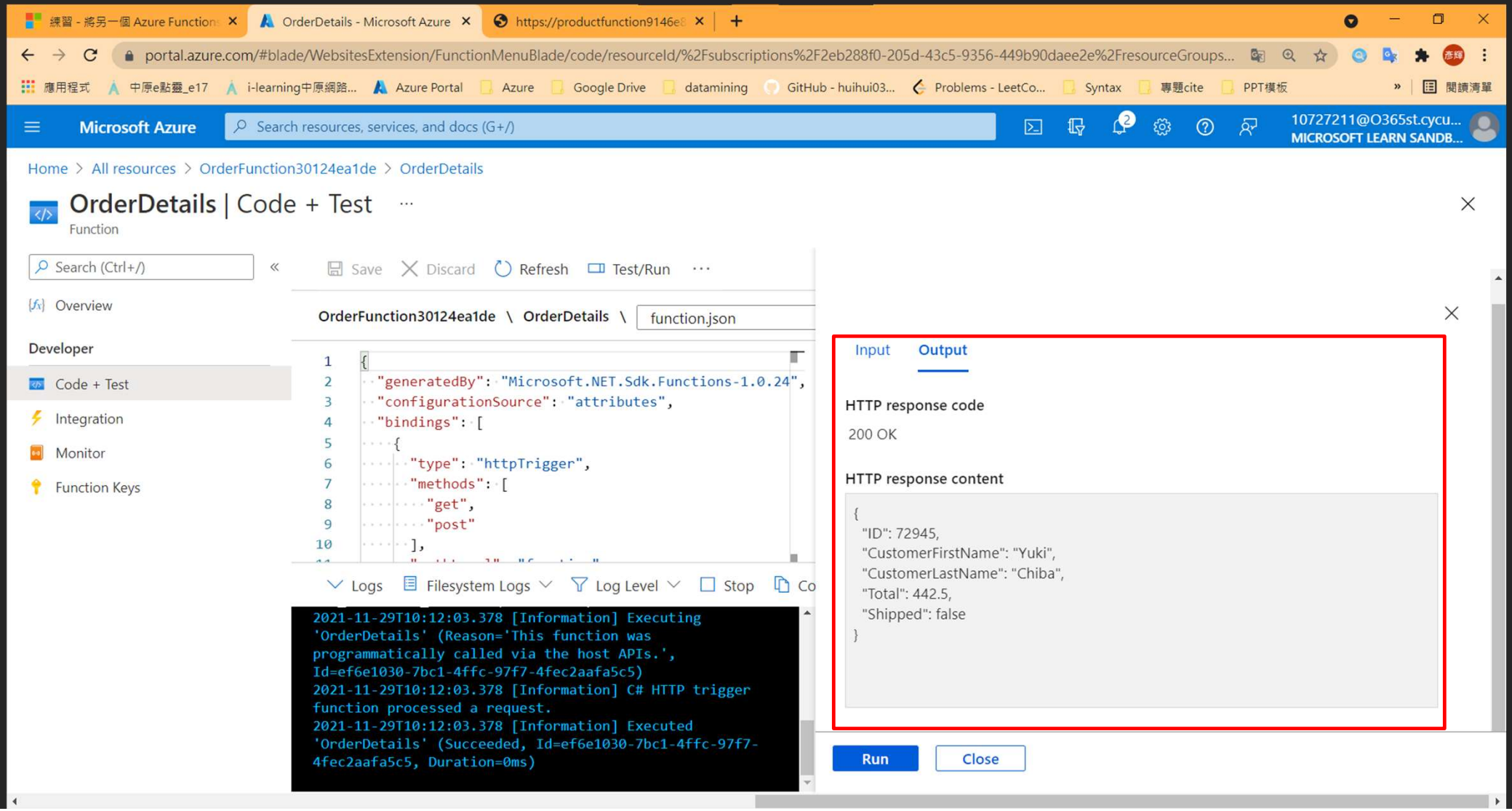
Test the OrderDetails function - 1



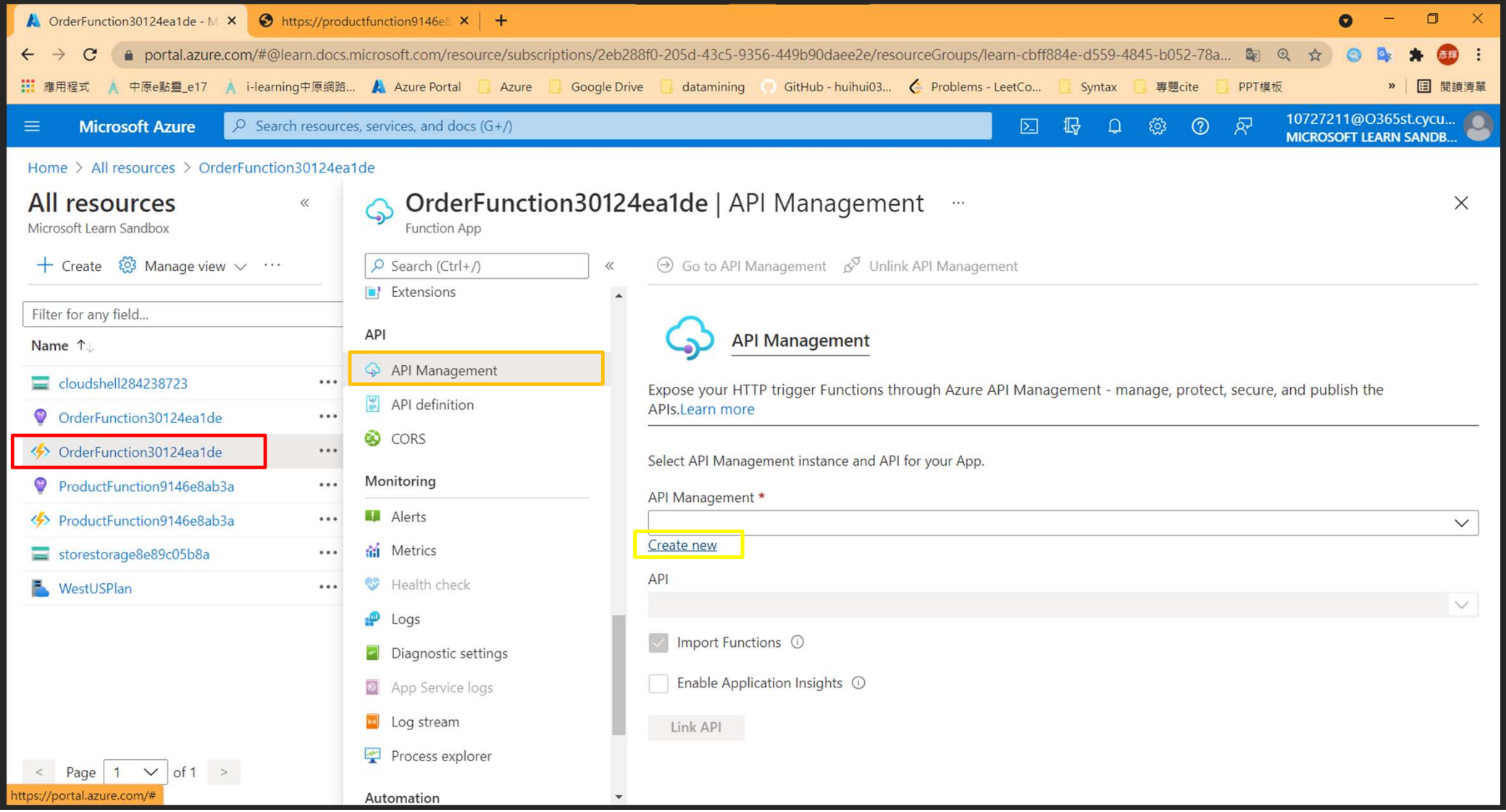
Test the OrderDetails function - 2



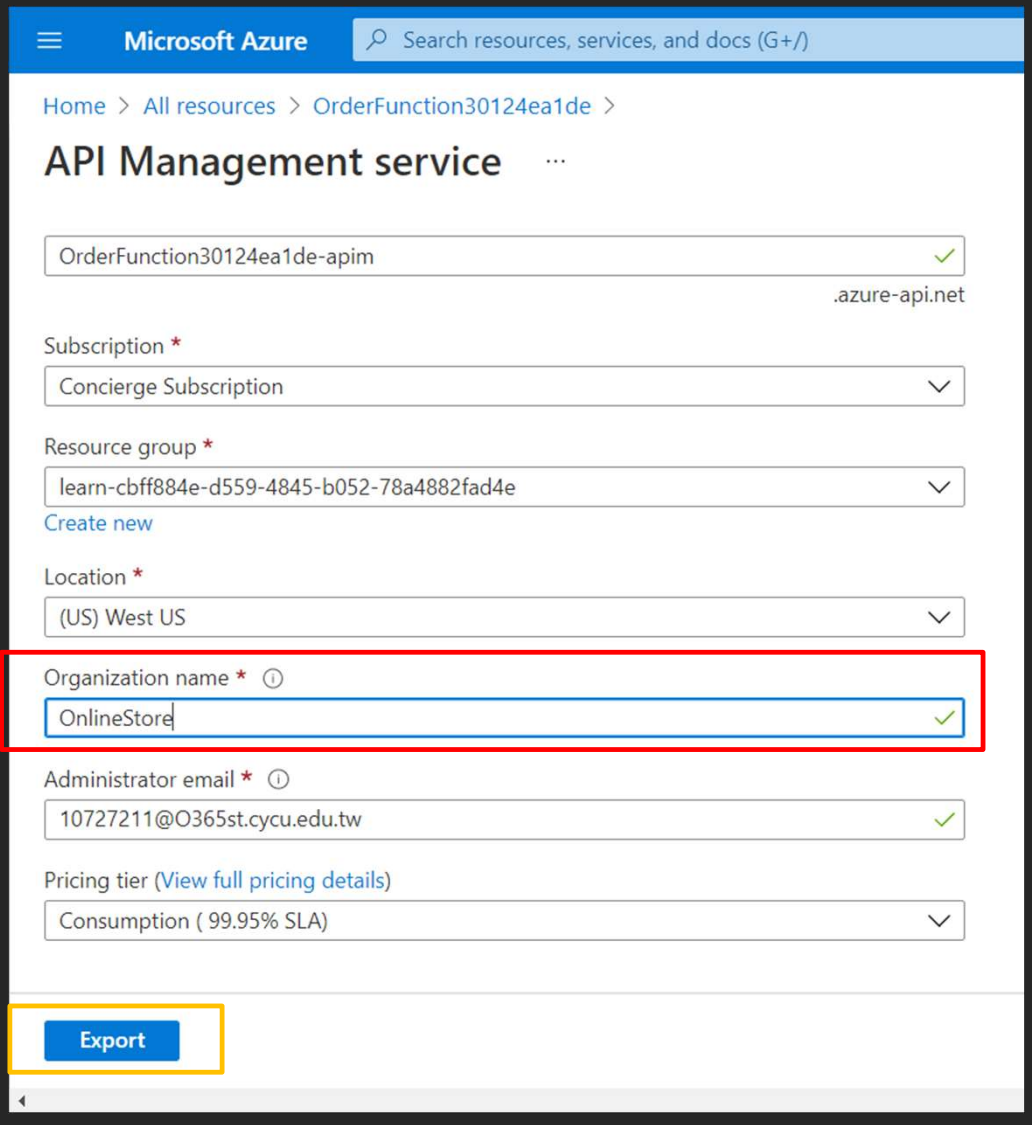
Test the OrderDetails function - 3



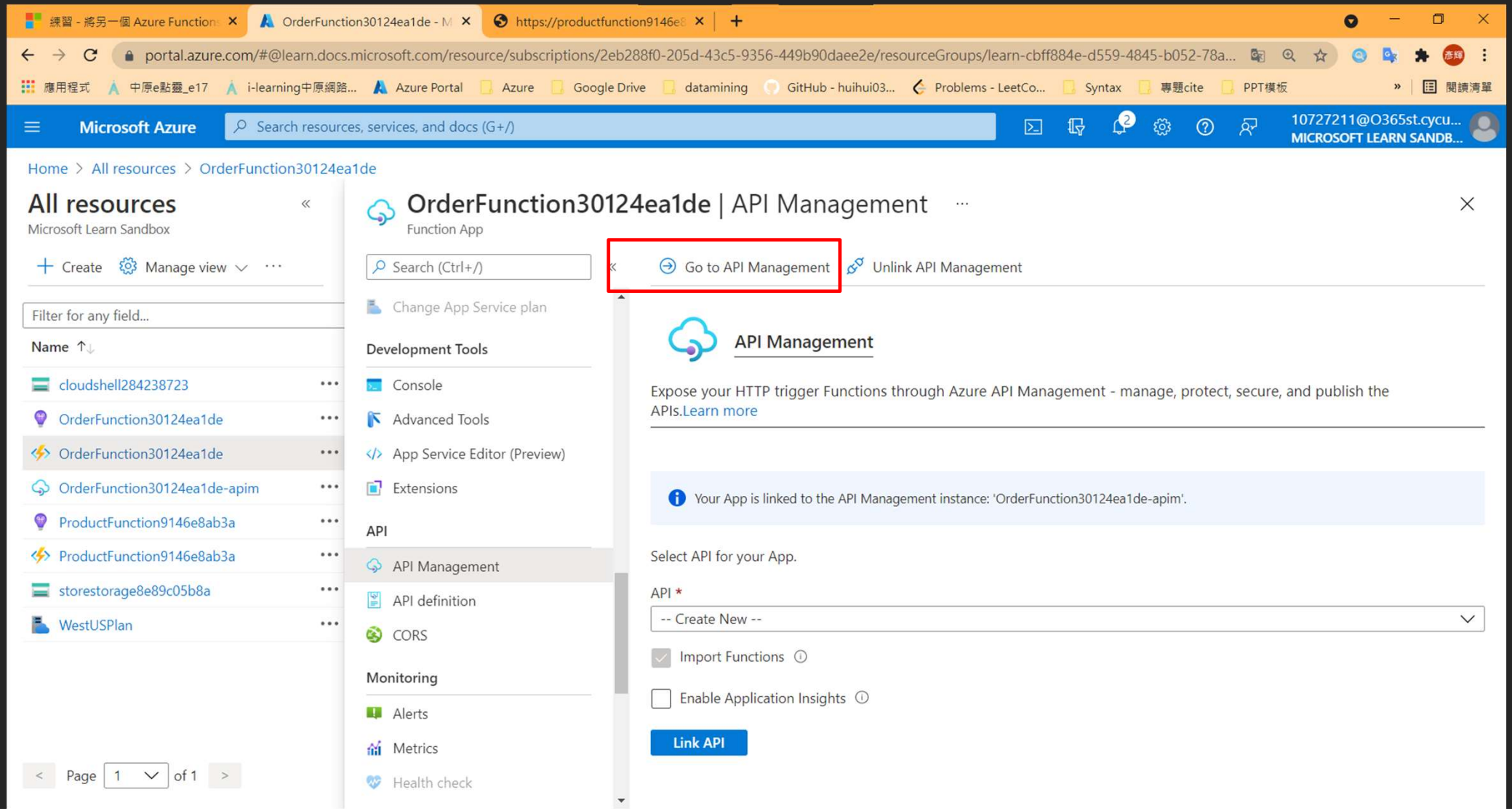
Add a function to an existing API - 1



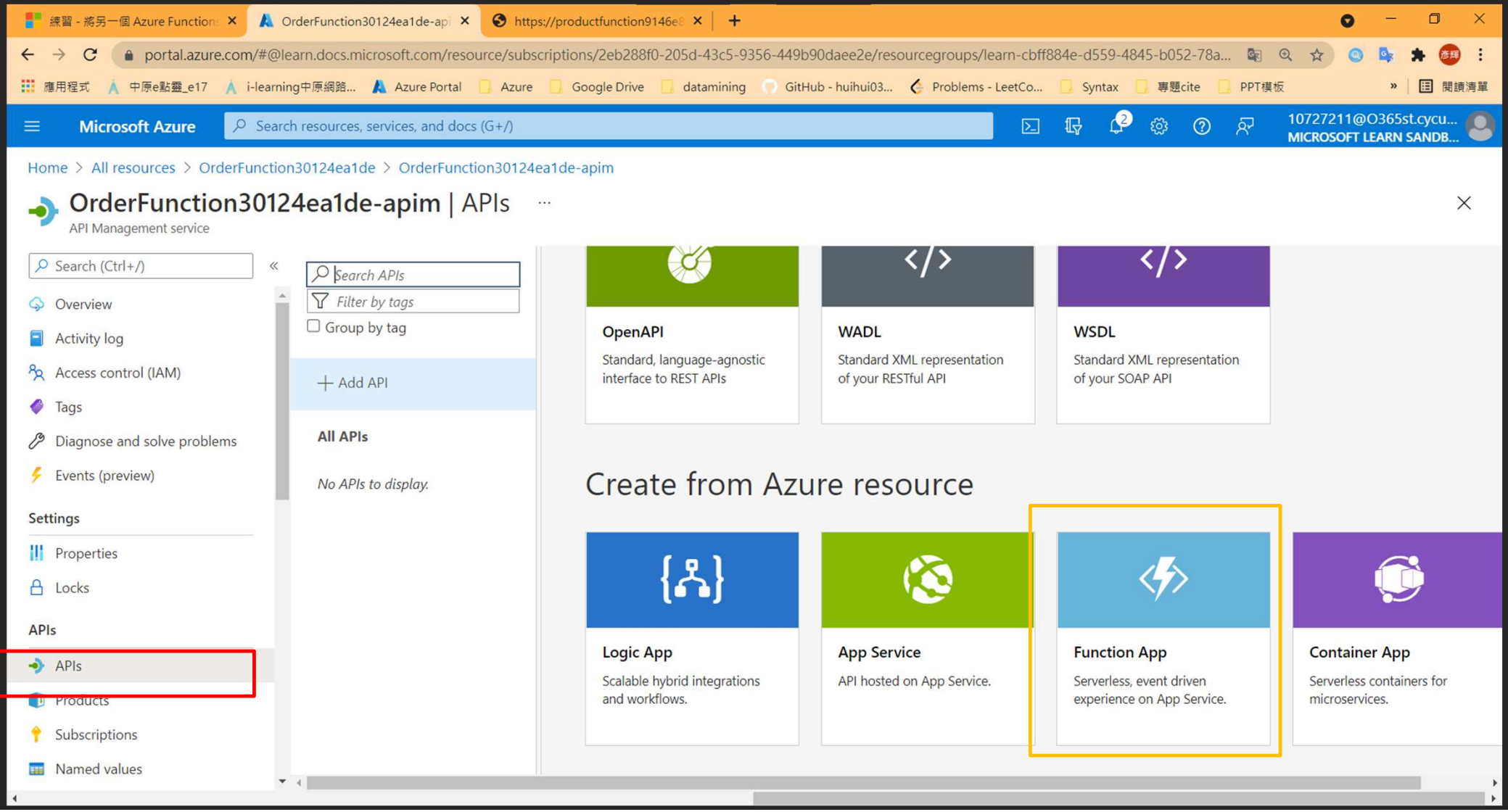
Add a function to an existing API - 2



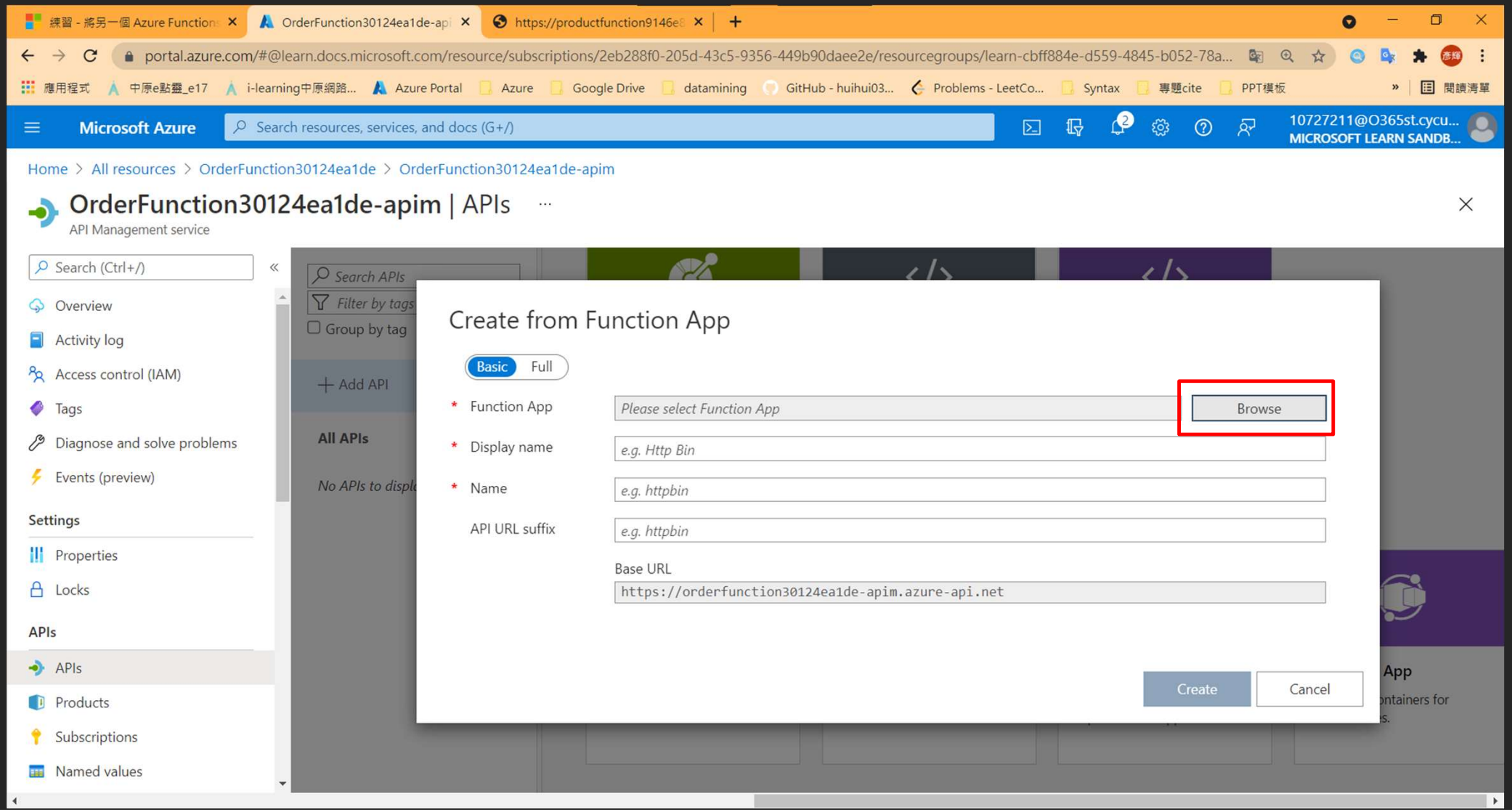
Add a function to an existing API - 3



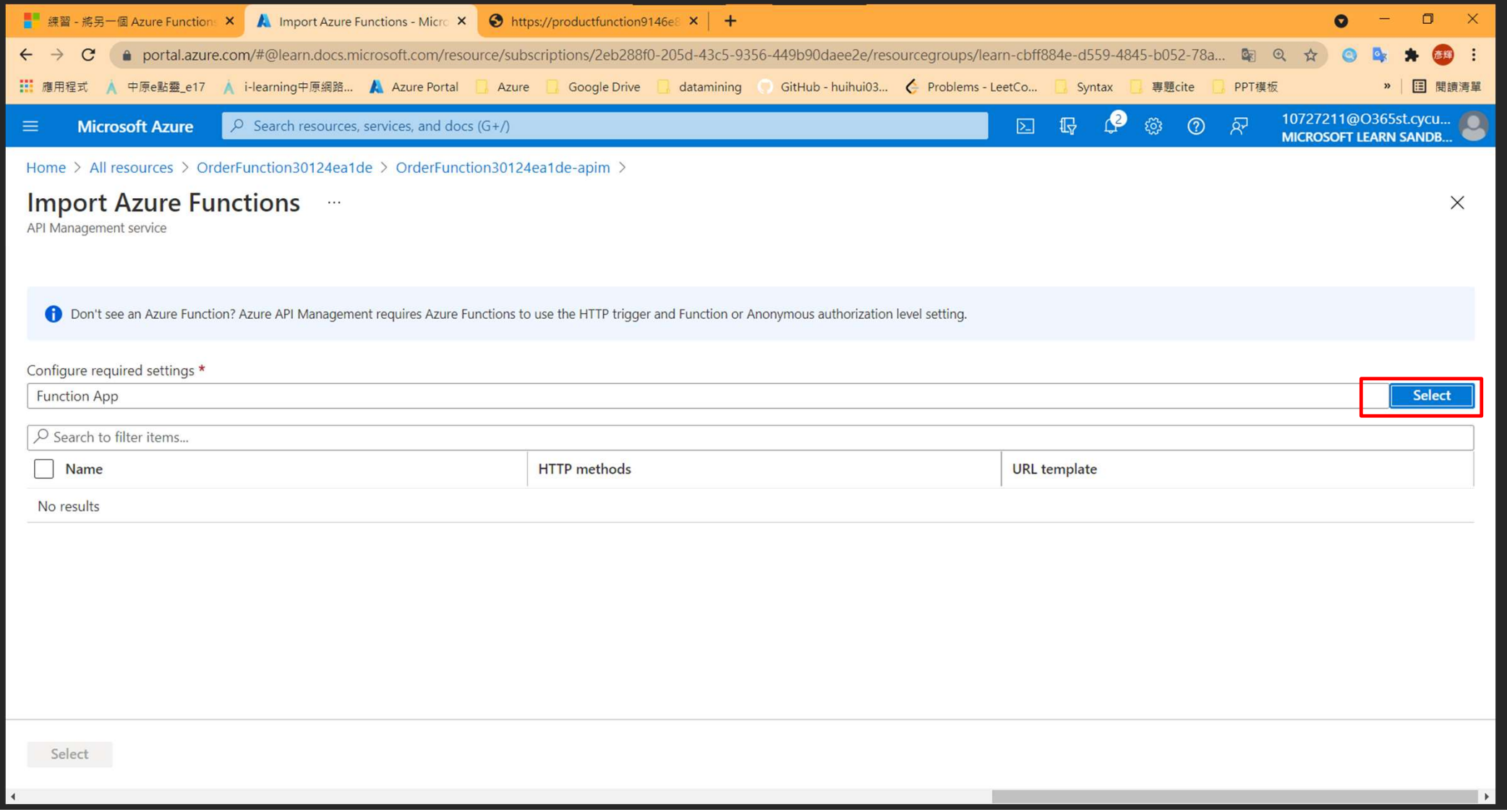
Add a function to an existing API - 4



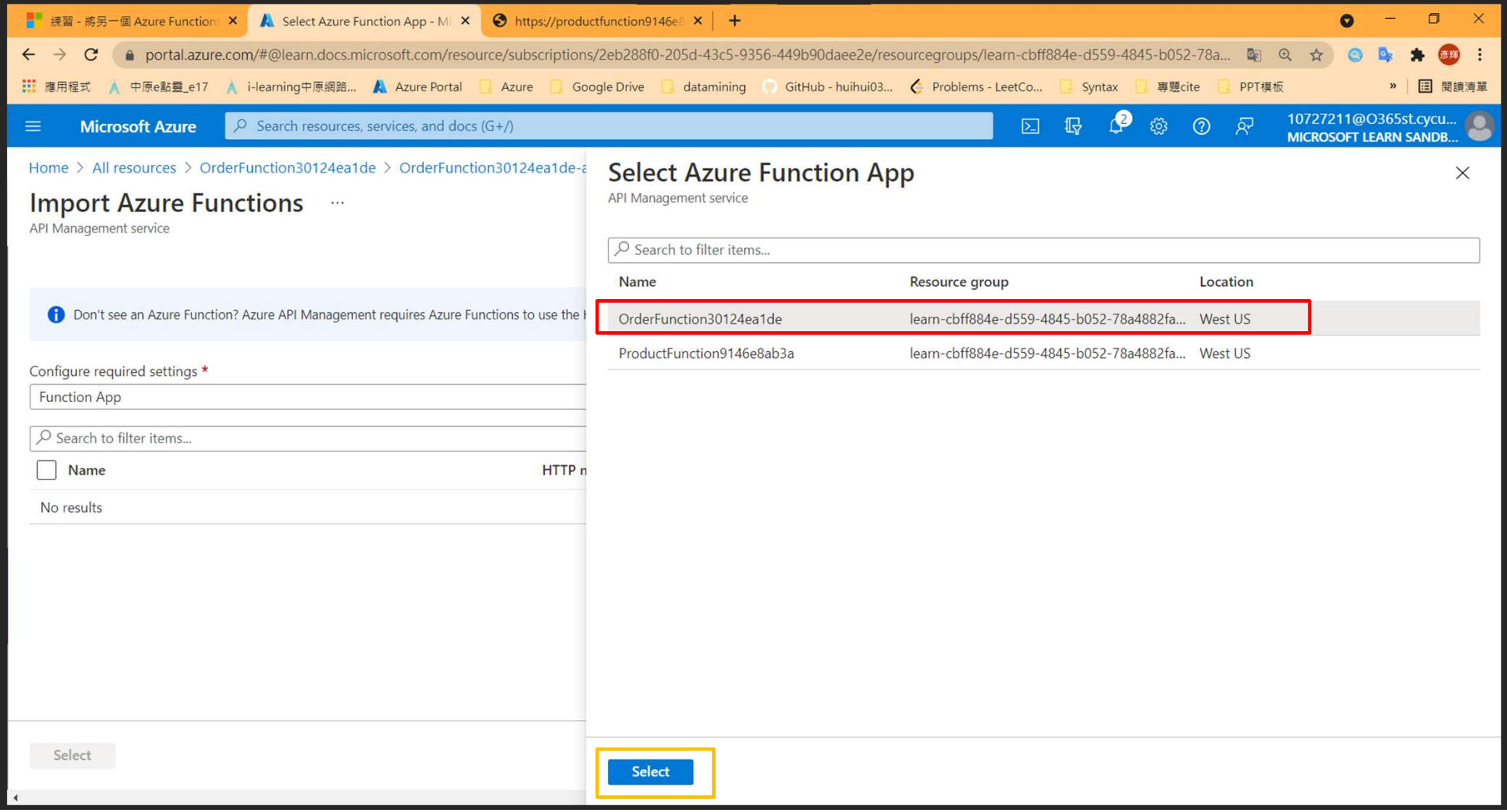
Add a function to an existing API - 5



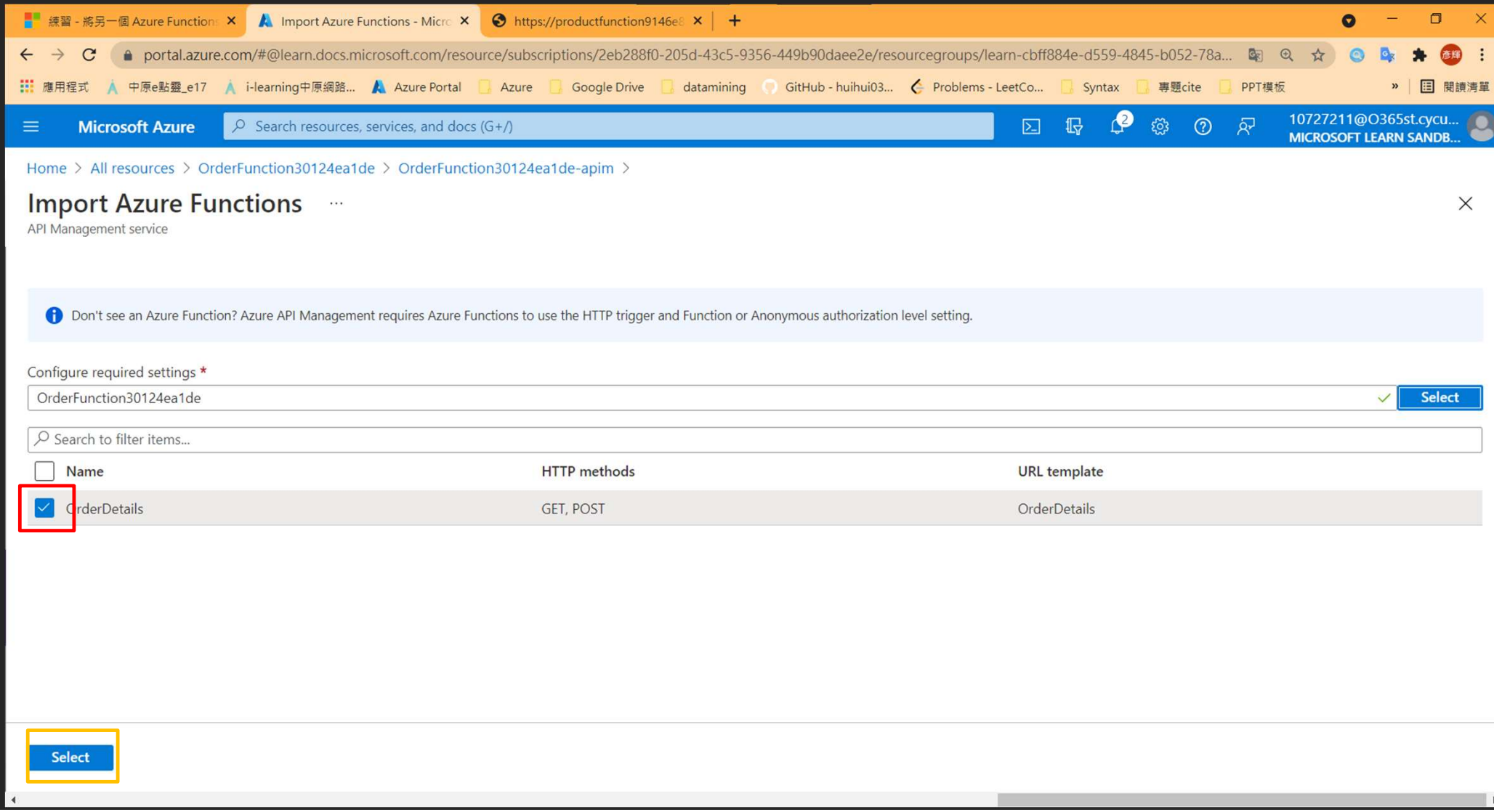
Add a function to an existing API - 6



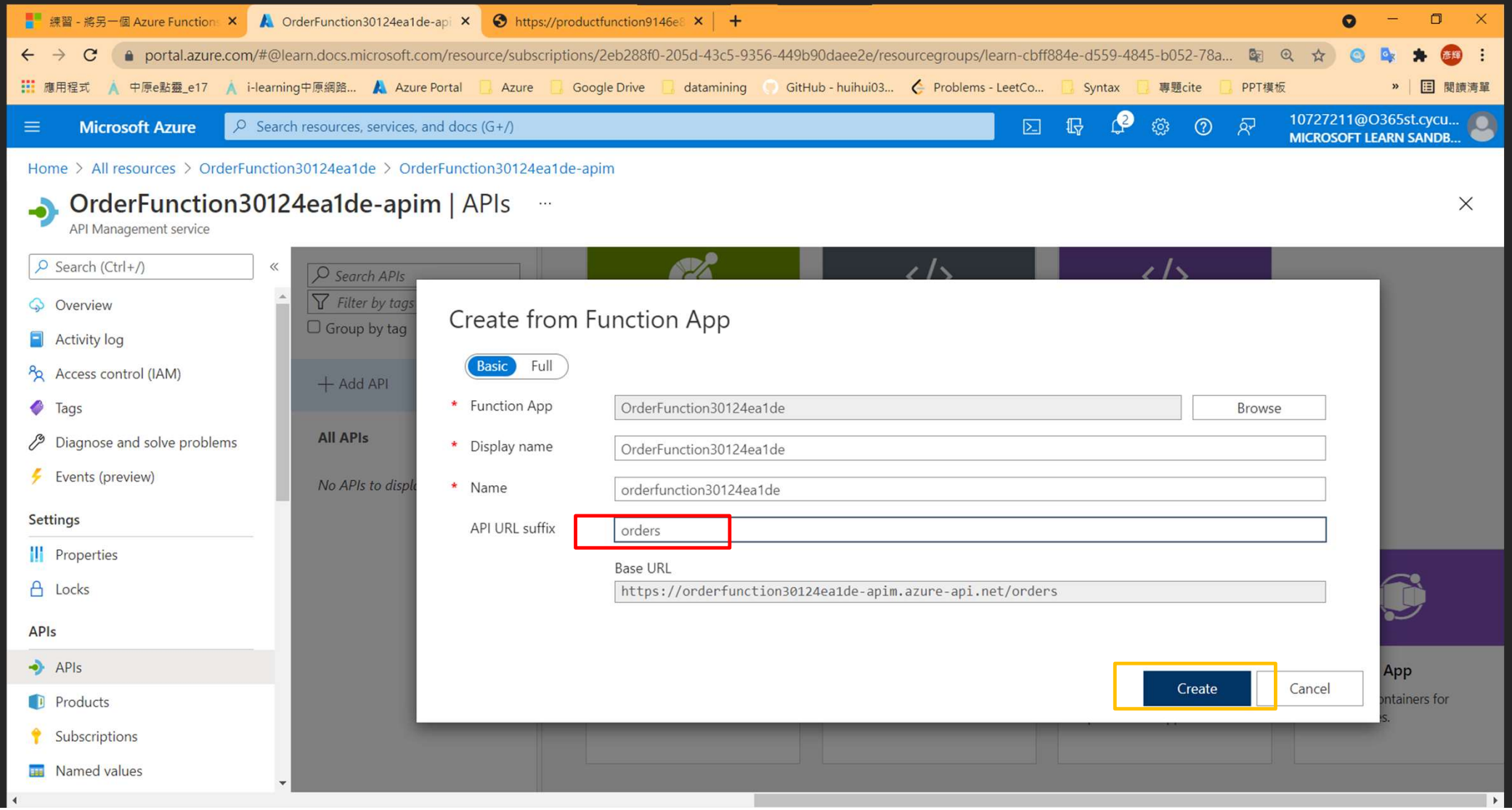
Add a function to an existing API - 7



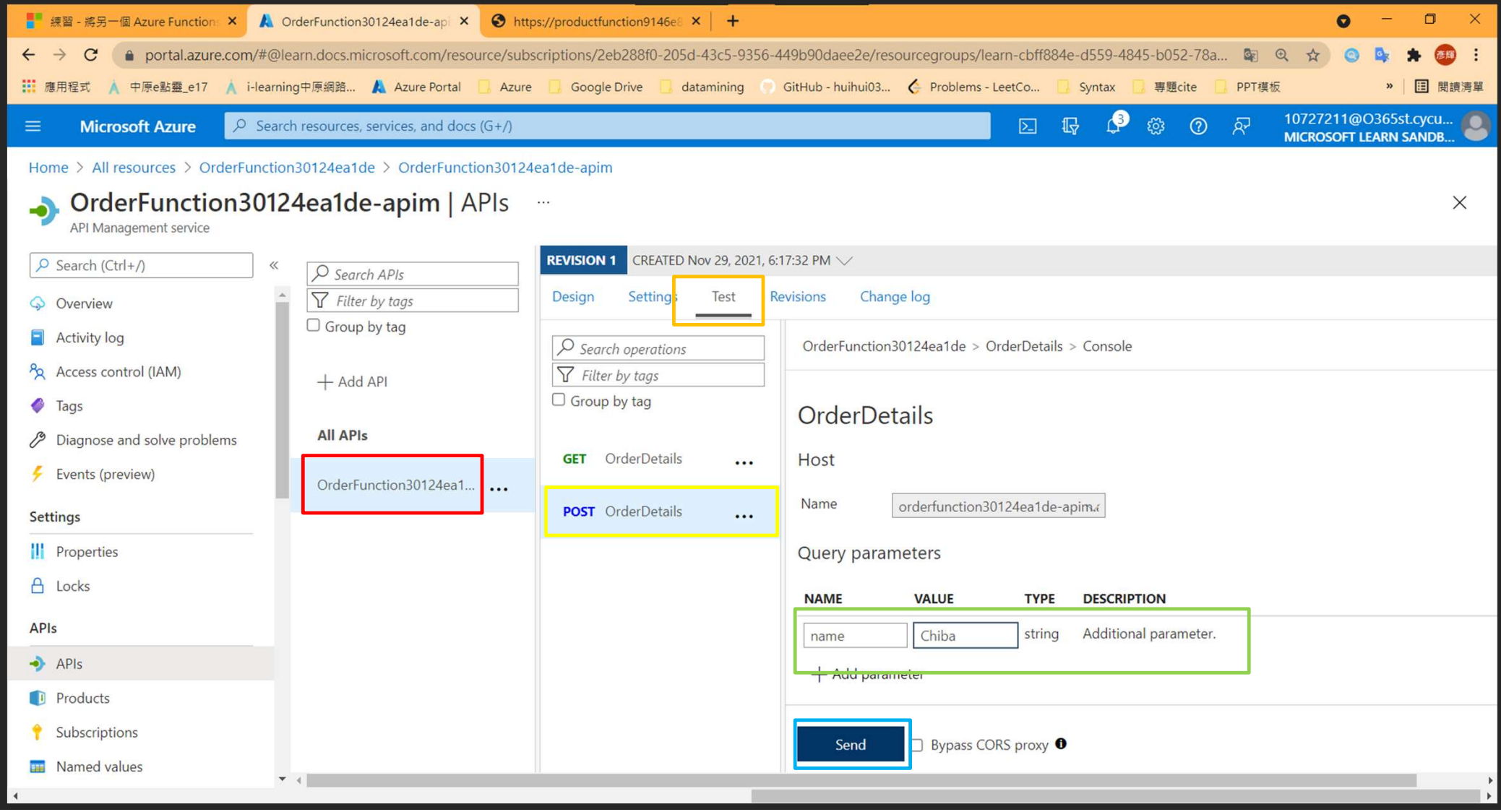
Add a function to an existing API - 8



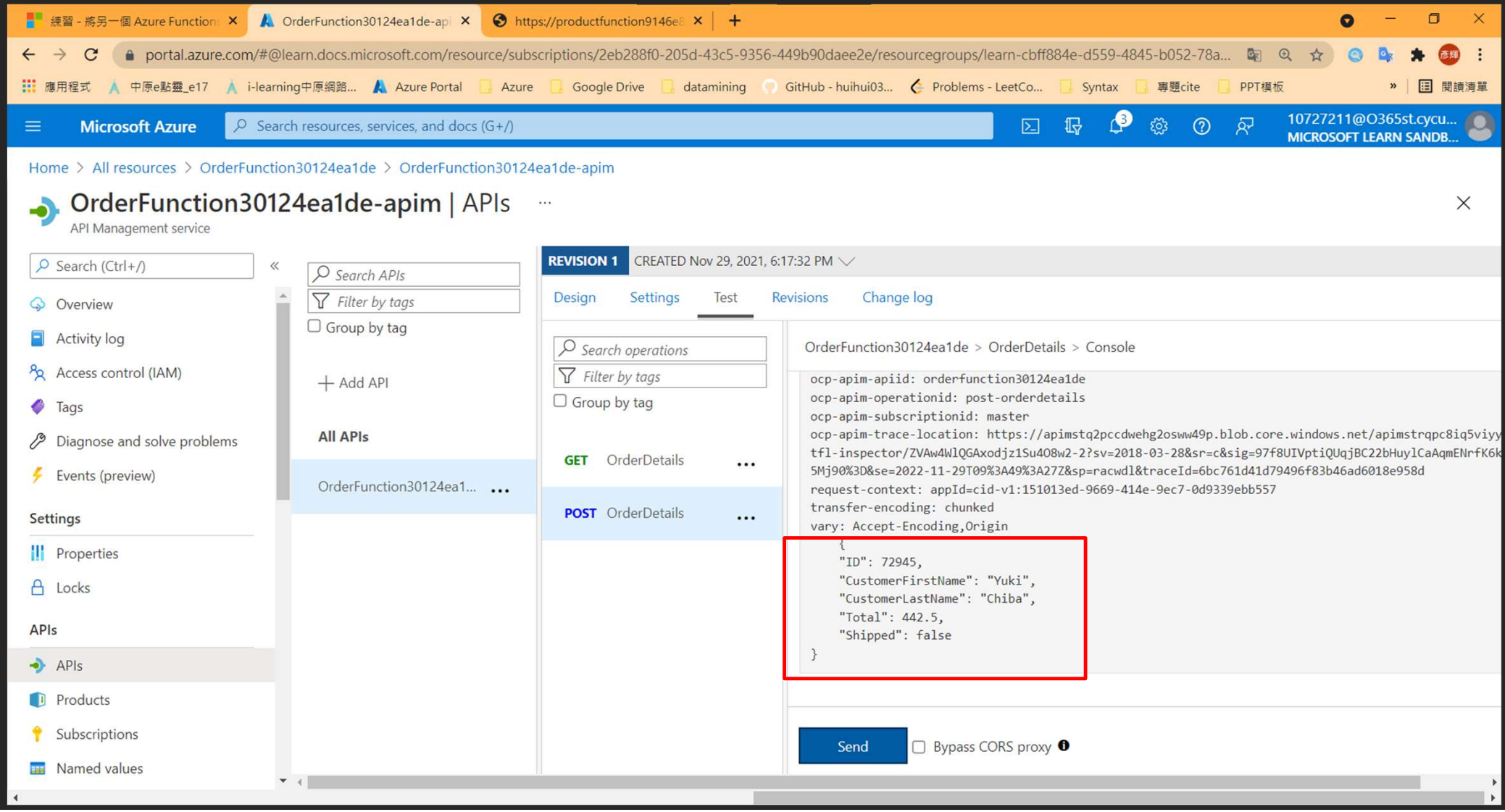
Add a function to an existing API - 9



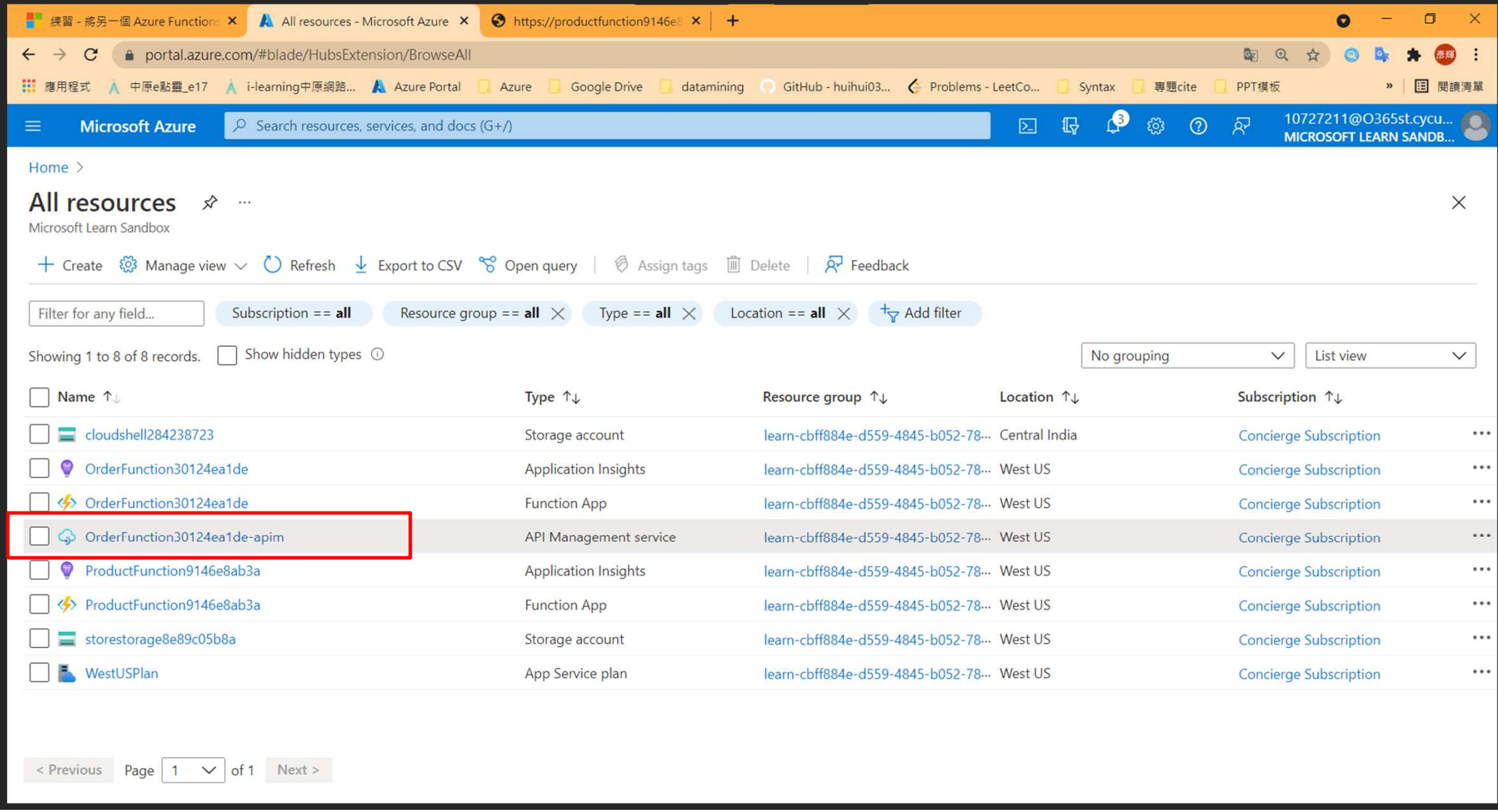
Test the OnlineStore orders endpoint in the portal - 1



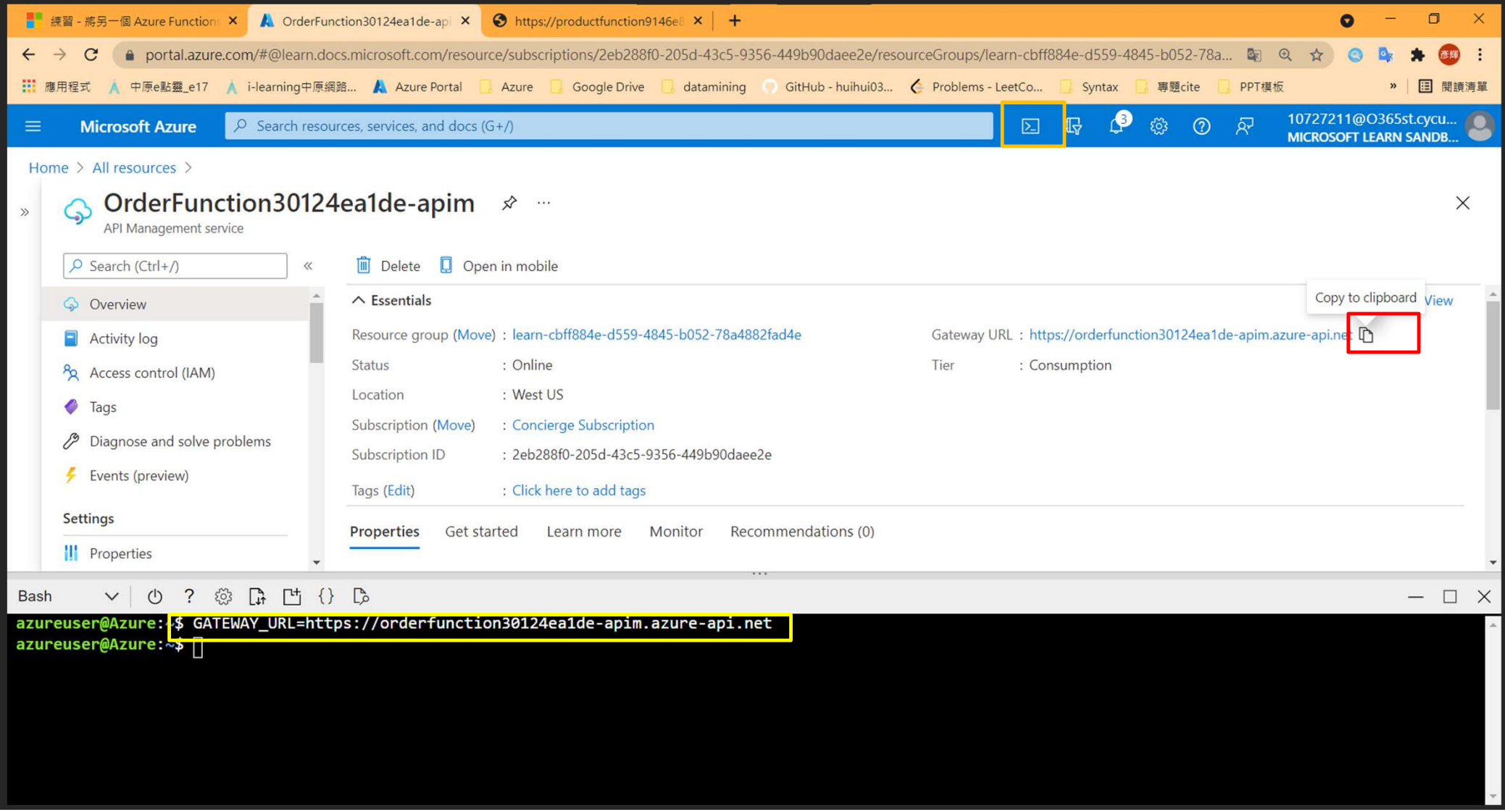
Test the OnlineStore orders endpoint in the portal - 2



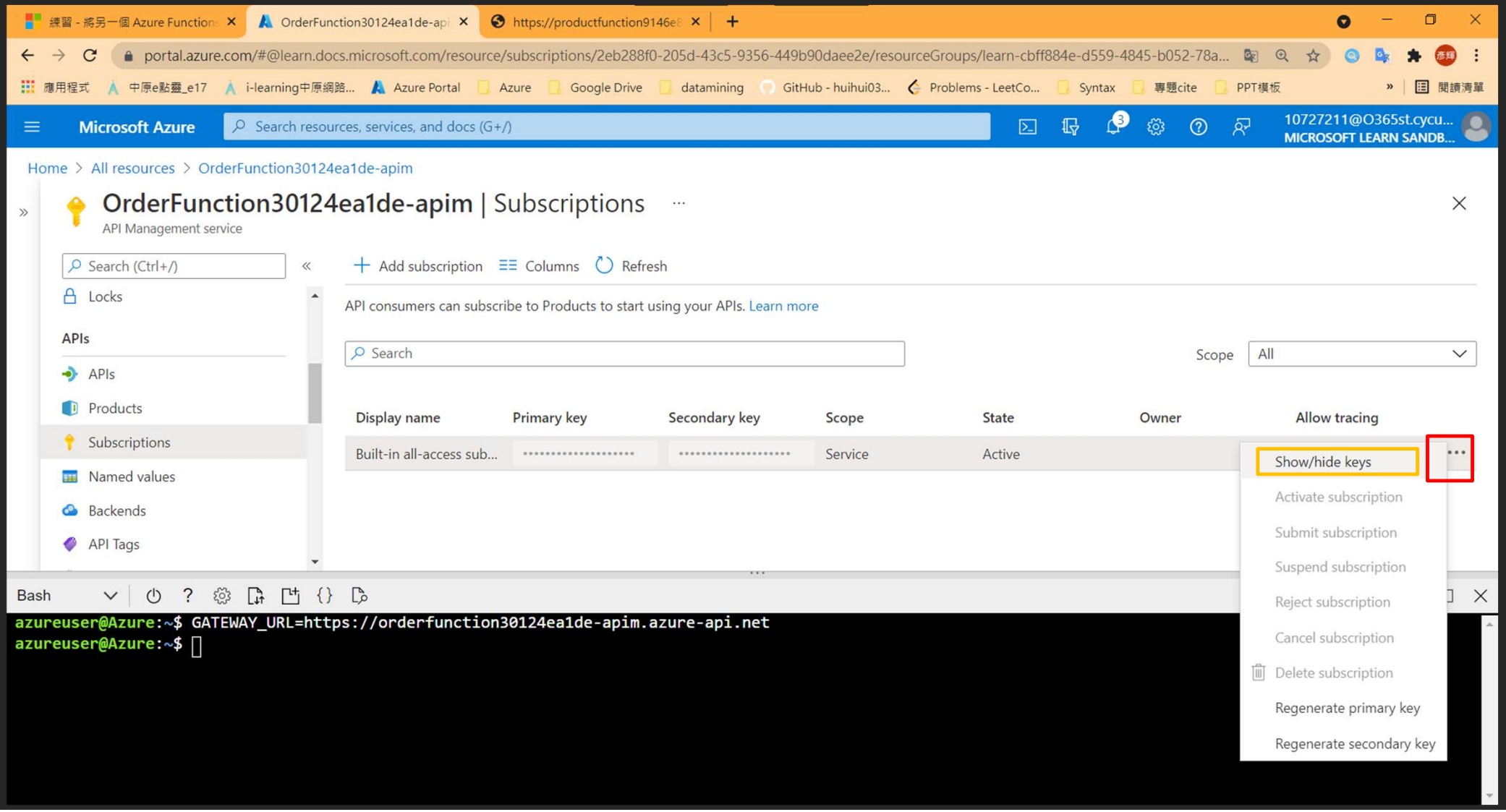
Test the combined API - 1



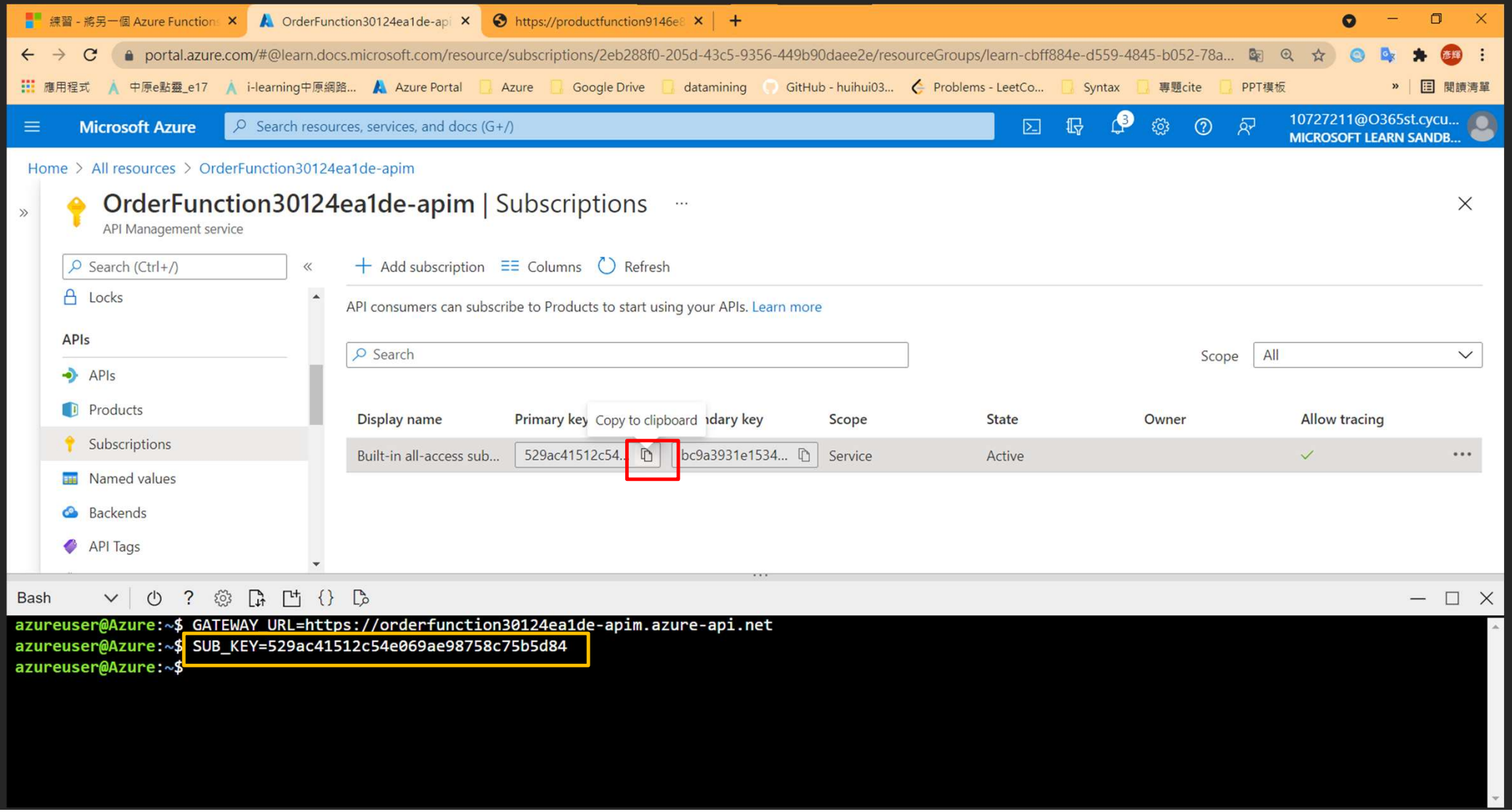
Test the combined API - 2



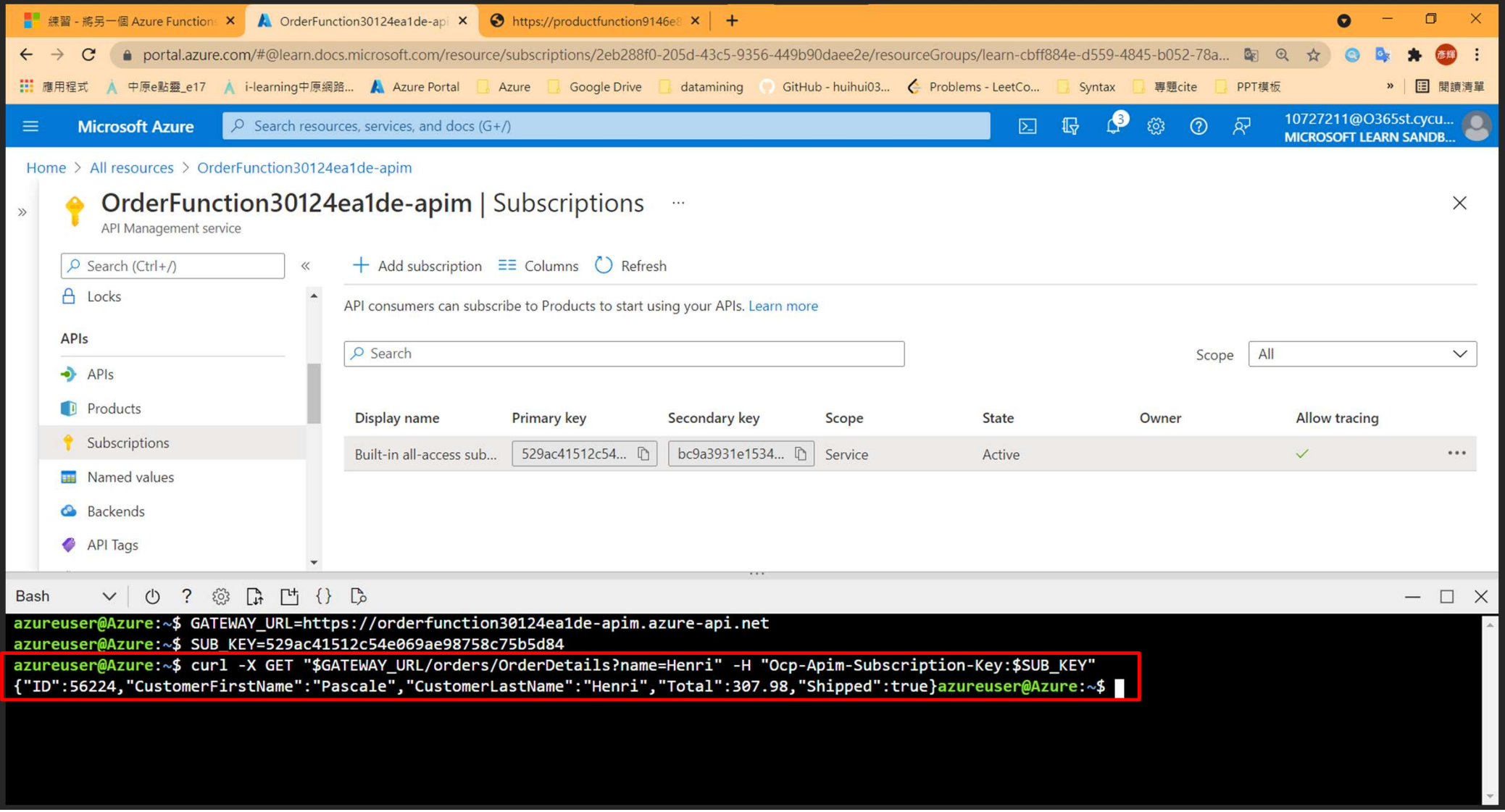
Test the combined API - 3



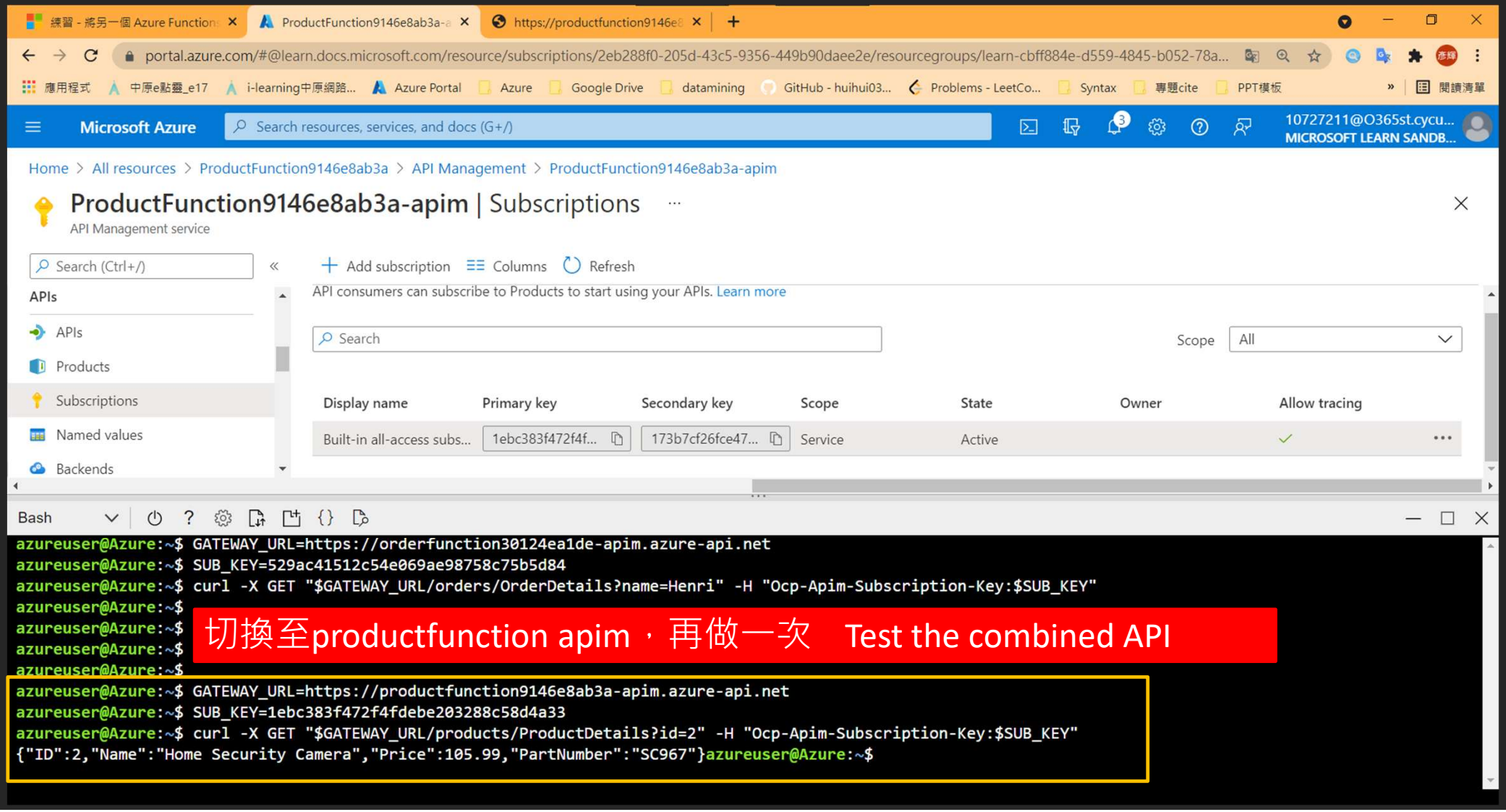
Test the combined API - 4



Test the combined API - 5



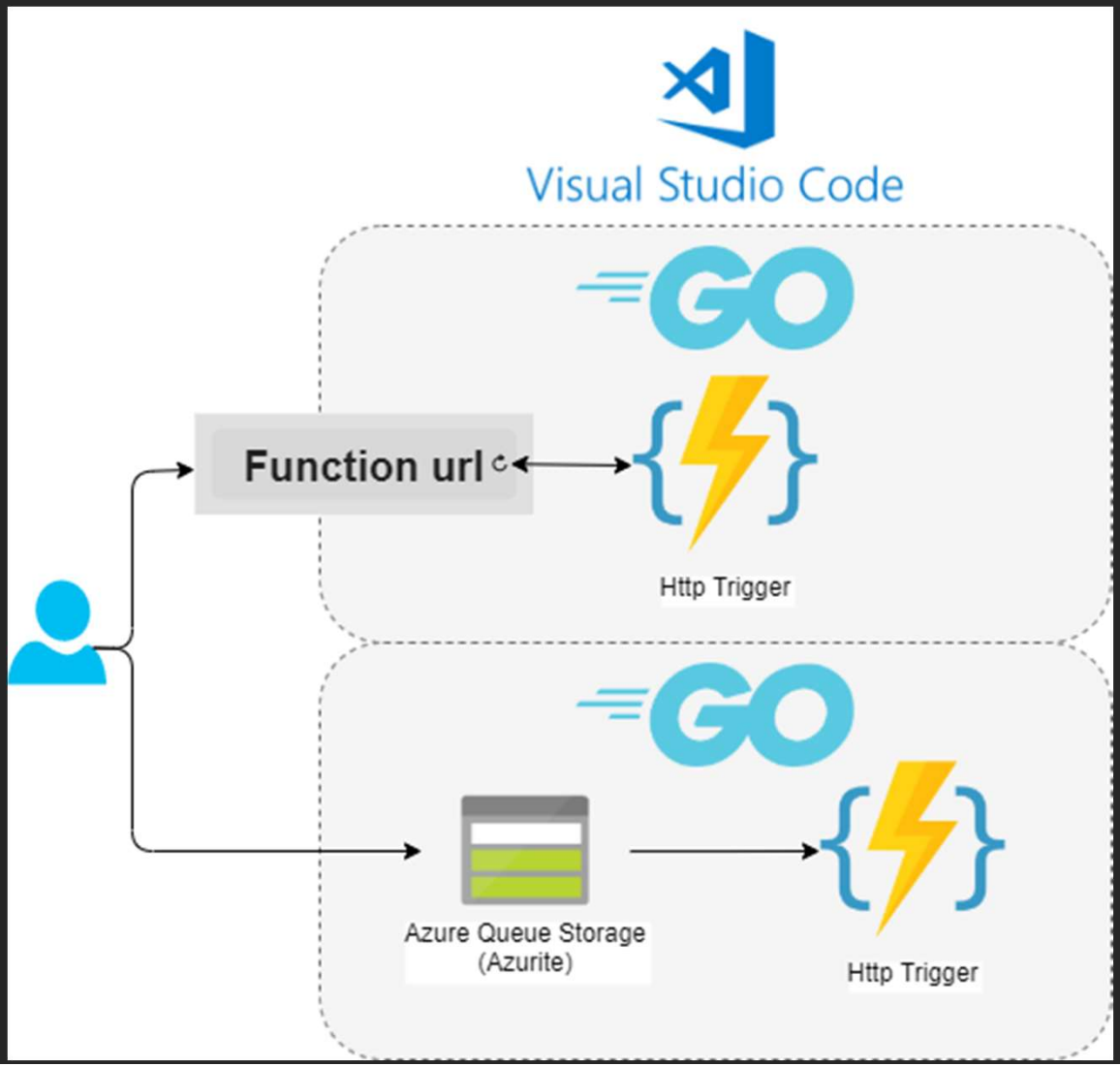
Test the combined API - 6



切換至productfunction apim，再做一次　Test the combined API

11 Build serverless apps with Go

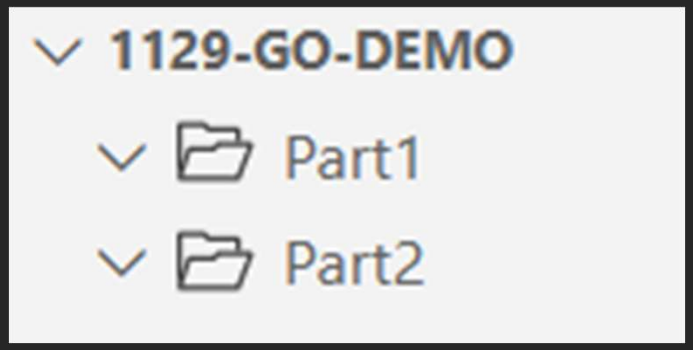
Abstract


Visual Studio Code
Function url
Http Trigger
Azure Queue Storage
(Azurite)
Http Trigger

Starter

Env : Visual Studio Code

/Go-Demo
- ├ Part1
- ├ Part2



Part1

切換至Part1目錄

Cmd :
Code <path>

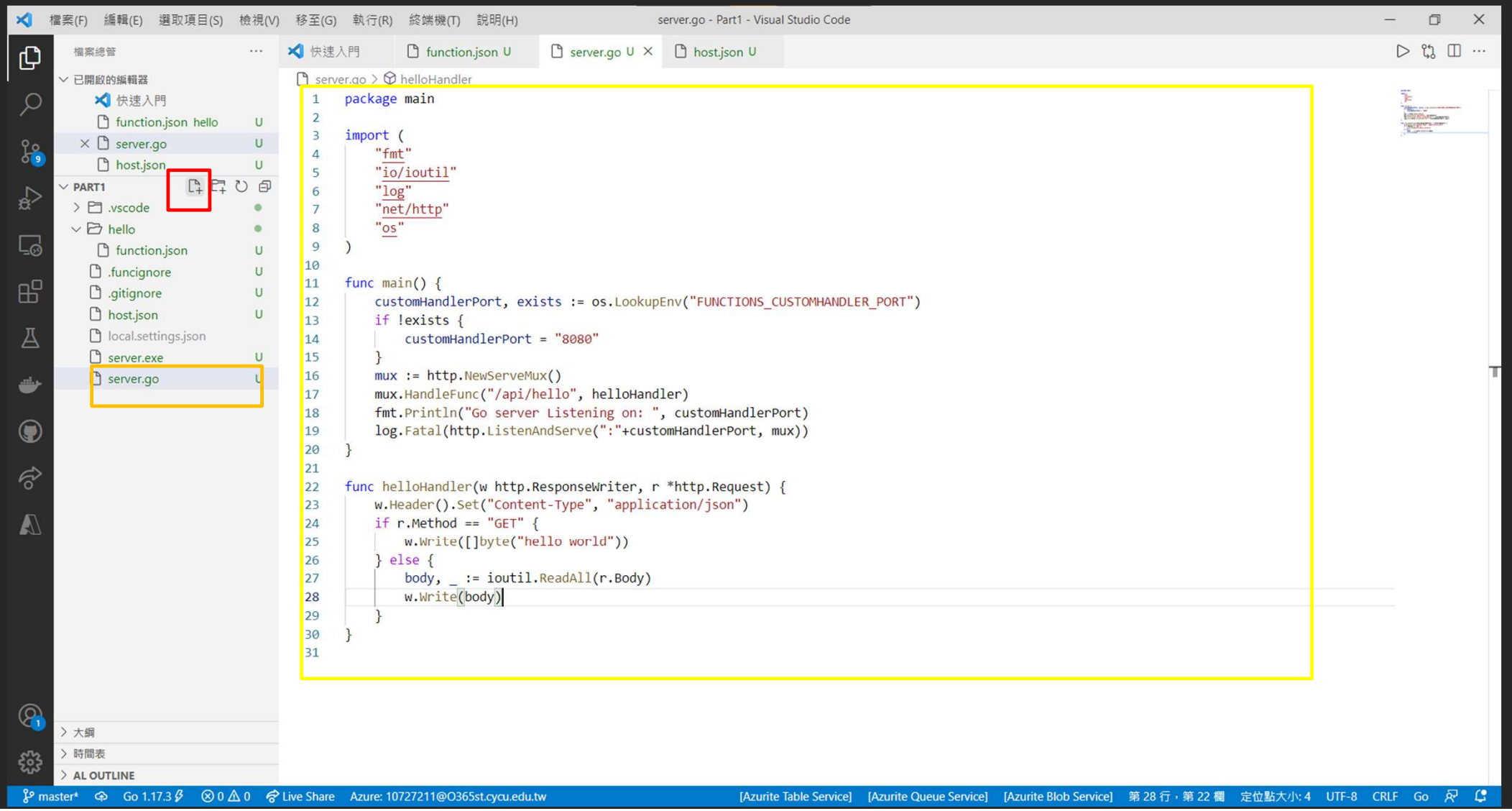
Eg: code .
Eg: code.\Part1\

```
PS C:\Users\phil8\Desktop\Azure\1129-go-demo>
PS C:\Users\phil8\Desktop\Azure\1129-go-demo>
PS C:\Users\phil8\Desktop\Azure\1129-go-demo> code .\Part1\
```

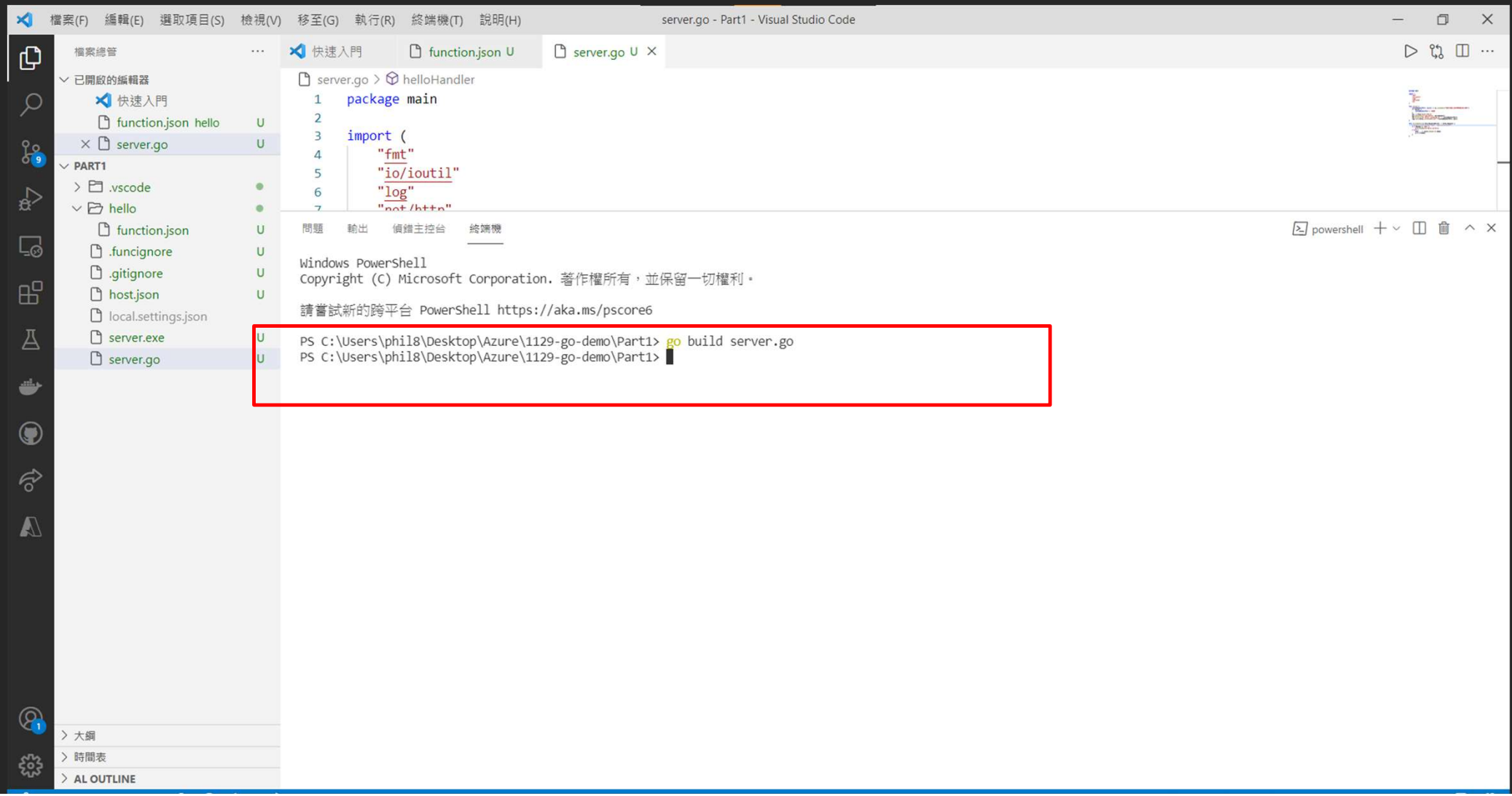
Scaffold the app

	Azure Functions: Create New Project
Select the folder that will contain your function project	{Part1}
Select a language	Custom Handler
Select a template for your first function	HttpTrigger
Provide a function name	hello
授權等級	Anonymous

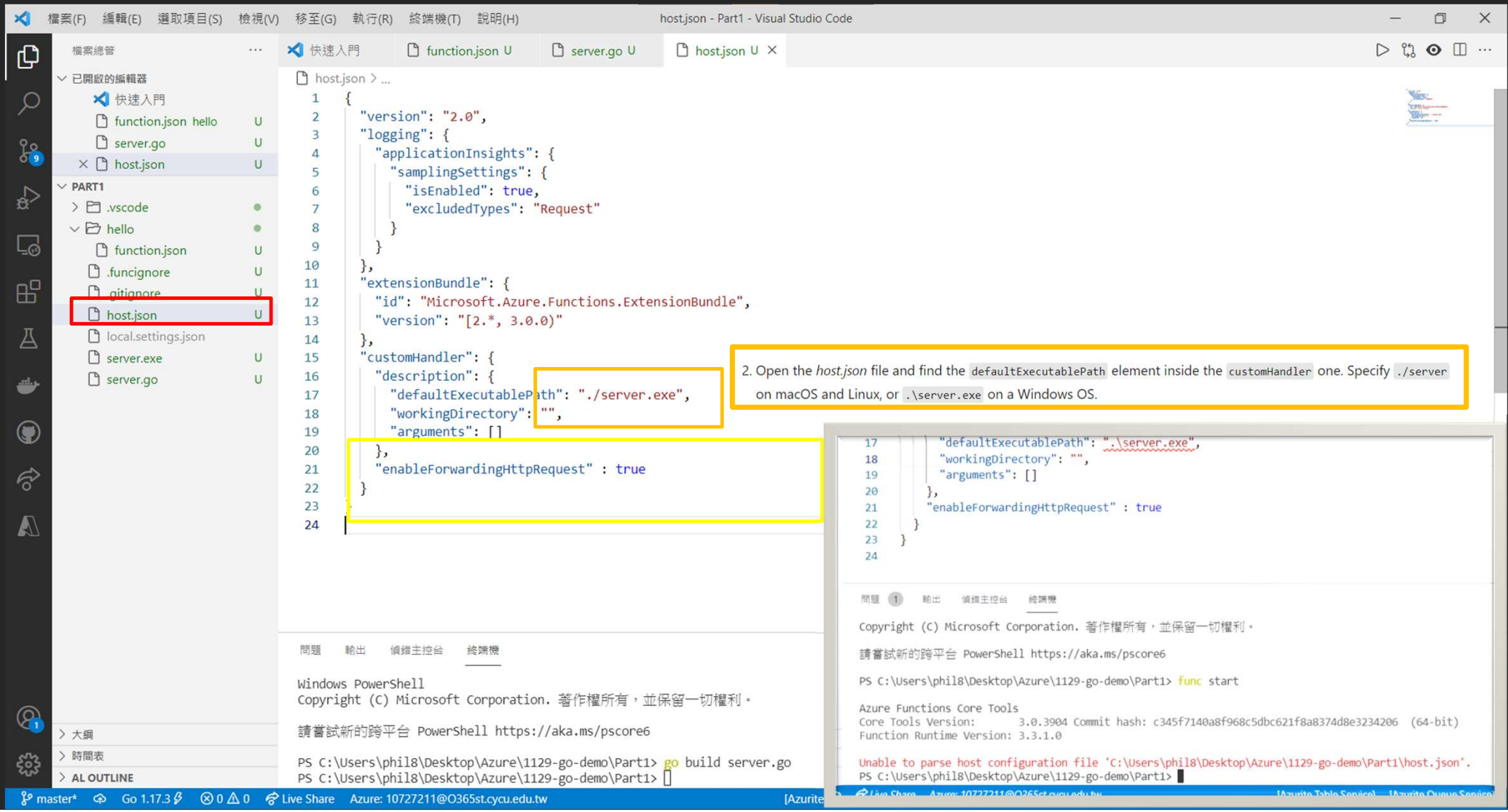
Create the app



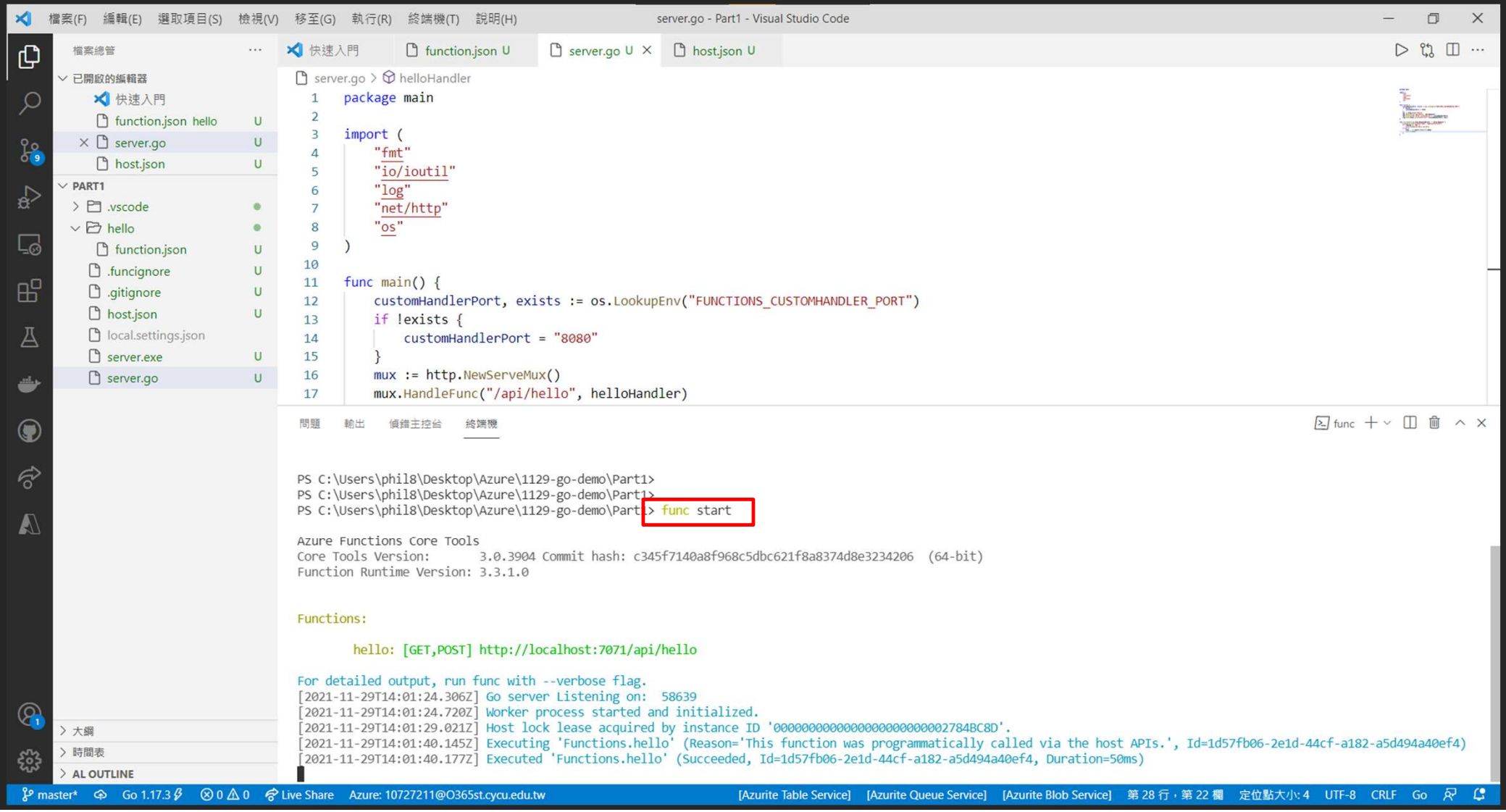
Run the app - 1


檔案(F) 編輯(E) 選取項目(S) 檢視(V) 移至(G) 執行(R) 終端機(T) 說明(H)
server.go - Part1 - Visual Studio Code
檔案總管
已開啟的編輯器
快速入門
function.json hello U
server.go U
PART1
.vscode
hello
function.json U
.funcignore U
.gitignore U
host.json U
local.settings.json
server.exe U
server.go U
大綱
時間表
AL OUTLINE
快速入門
function.json U
server.go U
server.go > helloHandler
1 package main
2
3 import (
4 "fmt"
5 "io/ioutil"
6 "log"
問題 輸出 偵錯主控台 終端機
powershell
Windows PowerShell
Copyright (C) Microsoft Corporation. 著作權所有，並保留一切權利。
請嘗試新的跨平台 PowerShell https://aka.ms/pscore6
PS C:\Users\phil8\Desktop\Azure\1129-go-demo\Part1> go build server.go
PS C:\Users\phil8\Desktop\Azure\1129-go-demo\Part1>

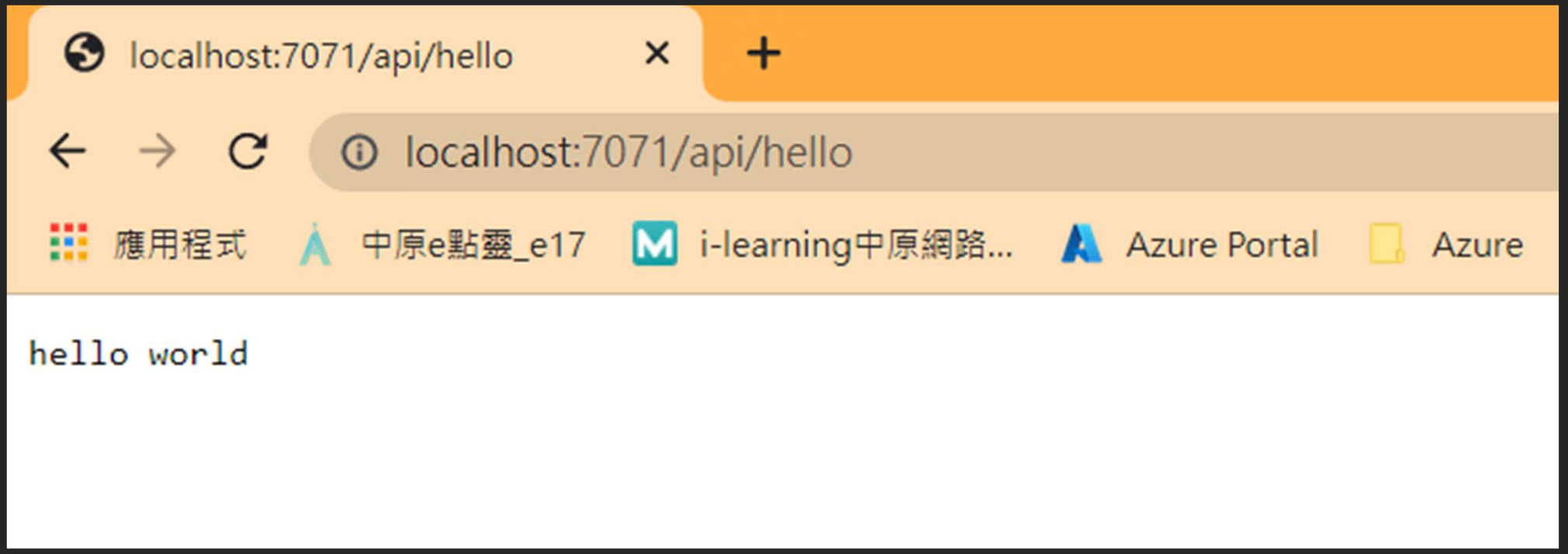
Run the app - 2


host.json - Part1 - Visual Studio Code
host.json
{
"version": "2.0",
"logging": {
"applicationInsights": {
"samplingSettings": {
"isEnabled": true,
"excludedTypes": "Request"
}
}
},
"extensionBundle": {
"id": "Microsoft.Azure.Functions.ExtensionBundle",
"version": "[2.*, 3.0.0)"
},
"customHandler": {
"description": {
"defaultExecutablePath": "./server.exe",
"workingDirectory": "",
"arguments": []
},
"enableForwardingHttpRequest" : true
}
}
2. Open the host.json file and find the defaultExecutablePath element inside the customHandler one. Specify ./server on macOS and Linux, or .\server.exe on a Windows OS.
"defaultExecutablePath": ".\server.exe",
"workingDirectory": "",
"arguments": []
},
"enableForwardingHttpRequest" : true
}
}
Copyright (C) Microsoft Corporation. 著作權所有，並保留一切權利。
請嘗試新的跨平台 PowerShell https://aka.ms/pscore6
PS C:\Users\phil8\Desktop\Azure\1129-go-demo\Part1> func start
Azure Functions Core Tools
Core Tools Version: 3.0.3904 Commit hash: c345f7140a8f968c5dbc621f8a8374d8e3234206 (64-bit)
Function Runtime Version: 3.3.1.0
Unable to parse host configuration file 'C:\Users\phil8\Desktop\Azure\1129-go-demo\Part1\host.json'.
PS C:\Users\phil8\Desktop\Azure\1129-go-demo\Part1>
Windows PowerShell
Copyright (C) Microsoft Corporation. 著作權所有，並保留一切權利。
請嘗試新的跨平台 PowerShell https://aka.ms/pscore6
PS C:\Users\phil8\Desktop\Azure\1129-go-demo\Part1> go build server.go
PS C:\Users\phil8\Desktop\Azure\1129-go-demo\Part1>
master* Go 1.17.3 0 0 Live Share Azure: 10727211@O365st.cycu.edu.tw

Run the app - 3


server.go - Part1 - Visual Studio Code
server.go
function.json
host.json
server.go > helloHandler
package main
import (
"fmt"
"io/ioutil"
"log"
"net/http"
"os"
)
func main() {
customHandlerPort, exists := os.LookupEnv("FUNCTIONS_CUSTOMHANDLER_PORT")
if !exists {
customHandlerPort = "8080"
}
mux := http.NewServeMux()
mux.HandleFunc("/api/hello", helloHandler)
PS C:\Users\phil8\Desktop\Azure\1129-go-demo\Part1>
PS C:\Users\phil8\Desktop\Azure\1129-go-demo\Part1>
PS C:\Users\phil8\Desktop\Azure\1129-go-demo\Part1> func start
Azure Functions Core Tools
Core Tools Version: 3.0.3904 Commit hash: c345f7140a8f968c5dbc621f8a8374d8e3234206 (64-bit)
Function Runtime Version: 3.3.1.0
Functions:
hello: [GET,POST] http://localhost:7071/api/hello
For detailed output, run func with --verbose flag.
[2021-11-29T14:01:24.306Z] Go server Listening on: 58639
[2021-11-29T14:01:24.720Z] Worker process started and initialized.
[2021-11-29T14:01:29.021Z] Host lock lease acquired by instance ID '00000000000000000000000002784BC8D'.
[2021-11-29T14:01:40.145Z] Executing 'Functions.hello' (Reason='This function was programmatically called via the host APIs.', Id=1d57fb06-2e1d-44cf-a182-a5d494a40ef4)
[2021-11-29T14:01:40.177Z] Executed 'Functions.hello' (Succeeded, Id=1d57fb06-2e1d-44cf-a182-a5d494a40ef4, Duration=50ms)

Run the app - 4

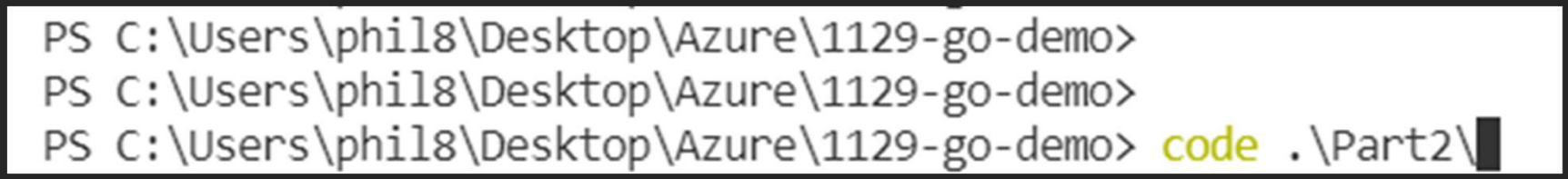

localhost:7071/api/hello
localhost:7071/api/hello
應用程式
中原e點靈_e17
i-learning中原網路...
Azure Portal
Azure
hello world

Part2

切換至Part2目錄

Cmd :
Code <path>

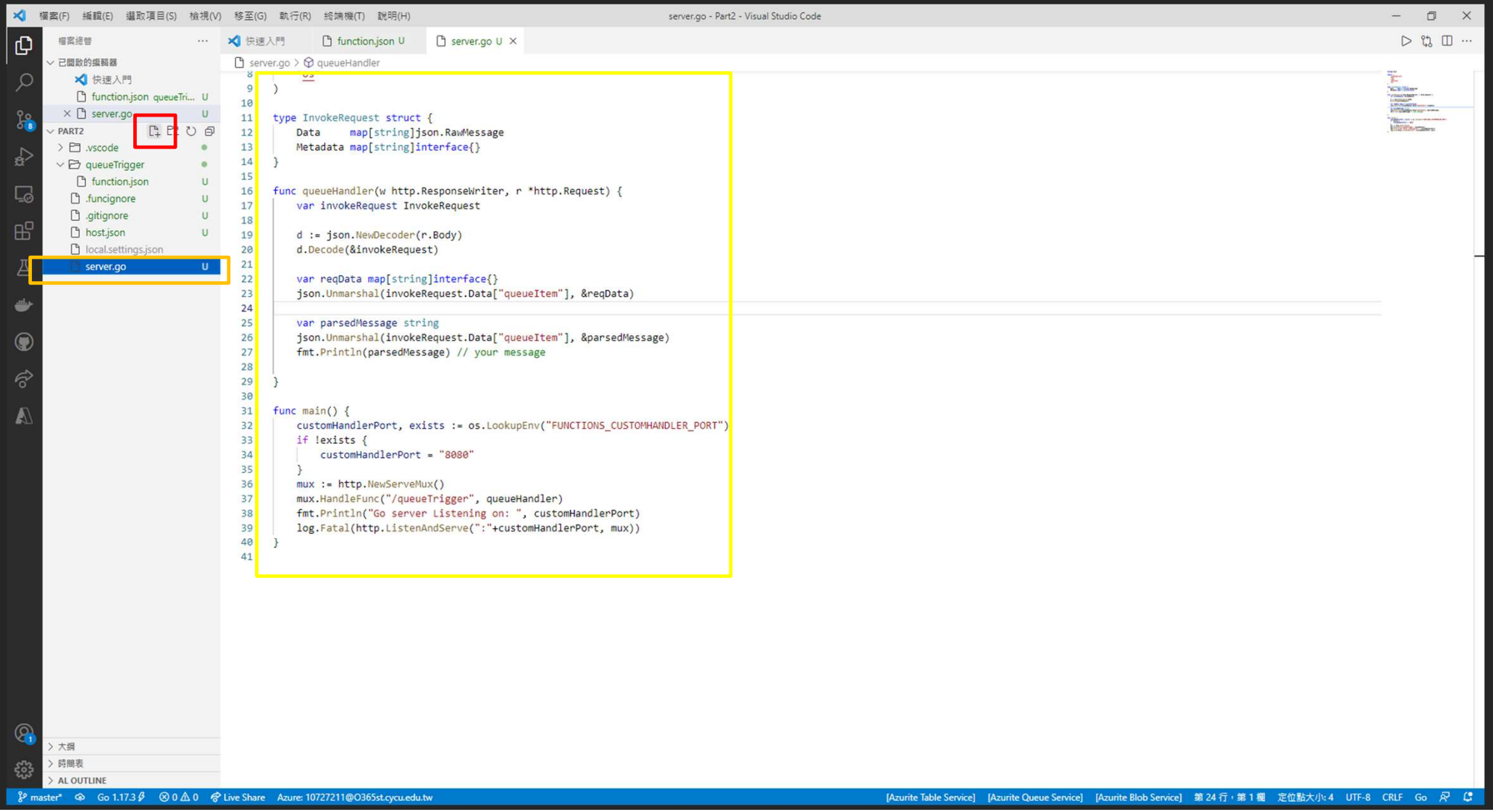
Eg: code .
Eg: code.\Part2\



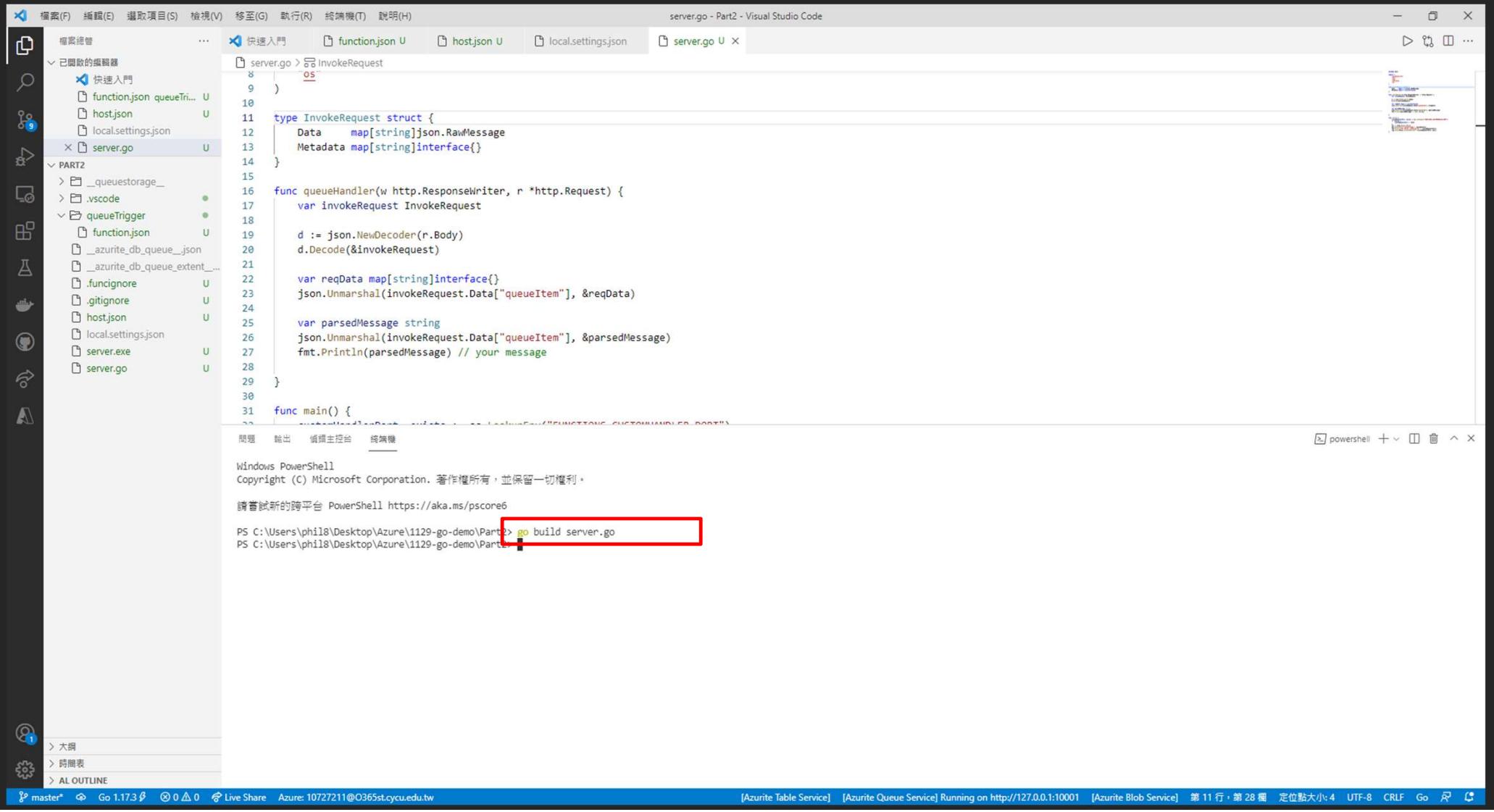
Scaffold the app

	Azure Functions: Create New Project
Select the folder that will contain your function project	{Part2}
Select a language	Custom Handler
Select a template for your first function	HttpTrigger
Provide a function name	queueTrigger
授權等級	Anonymous

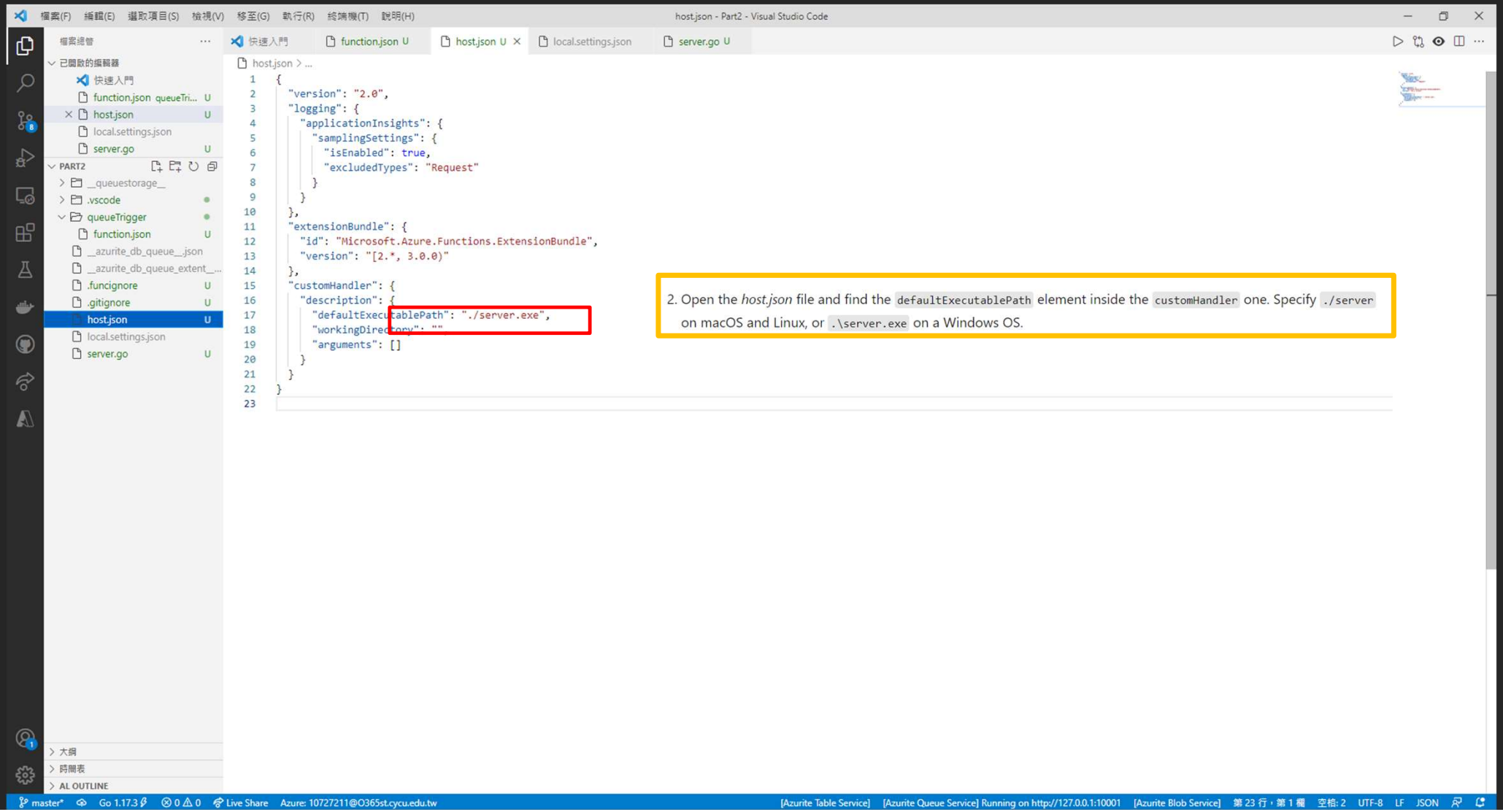
Create the app - 1



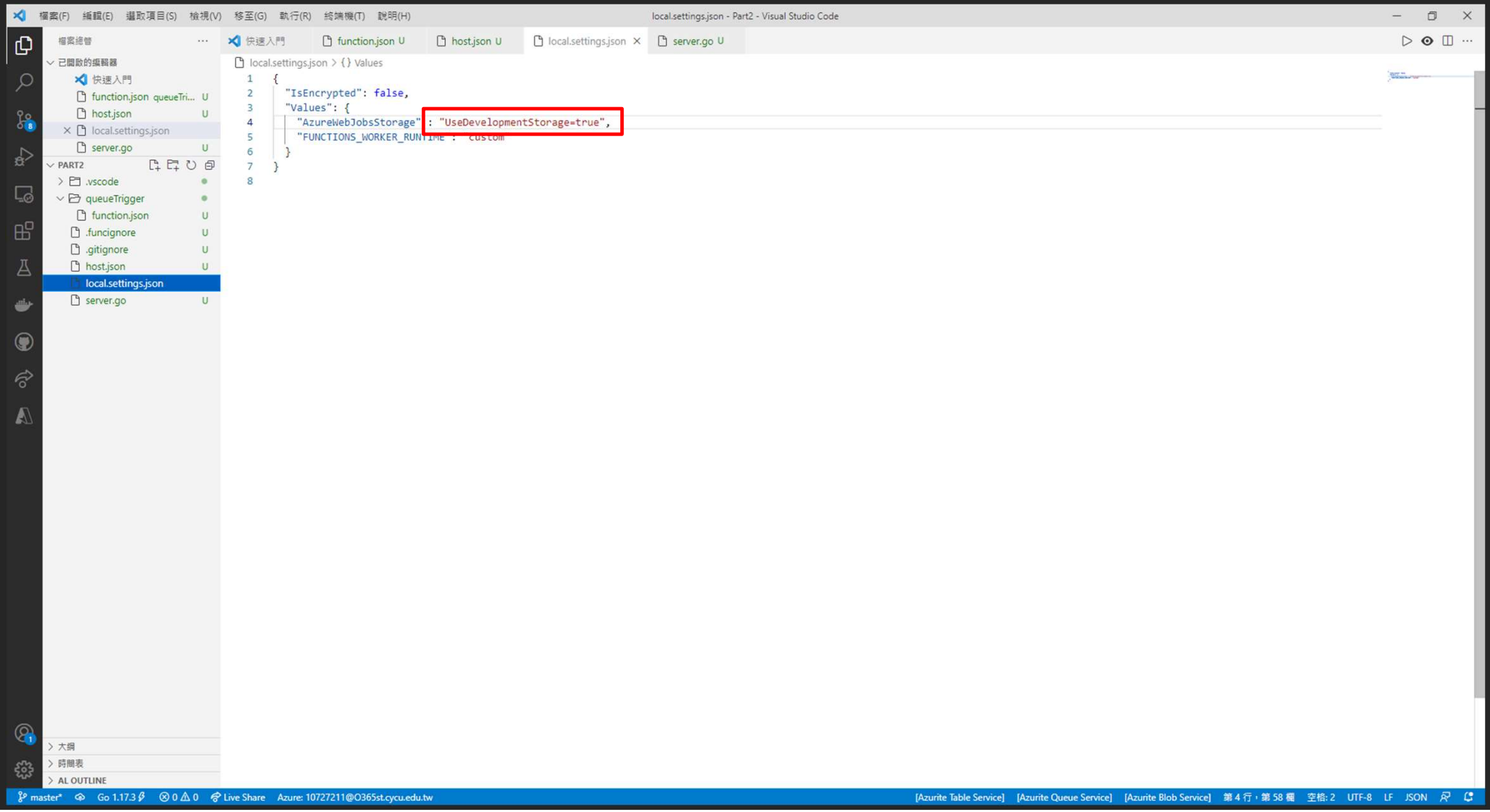
Create the app - 2



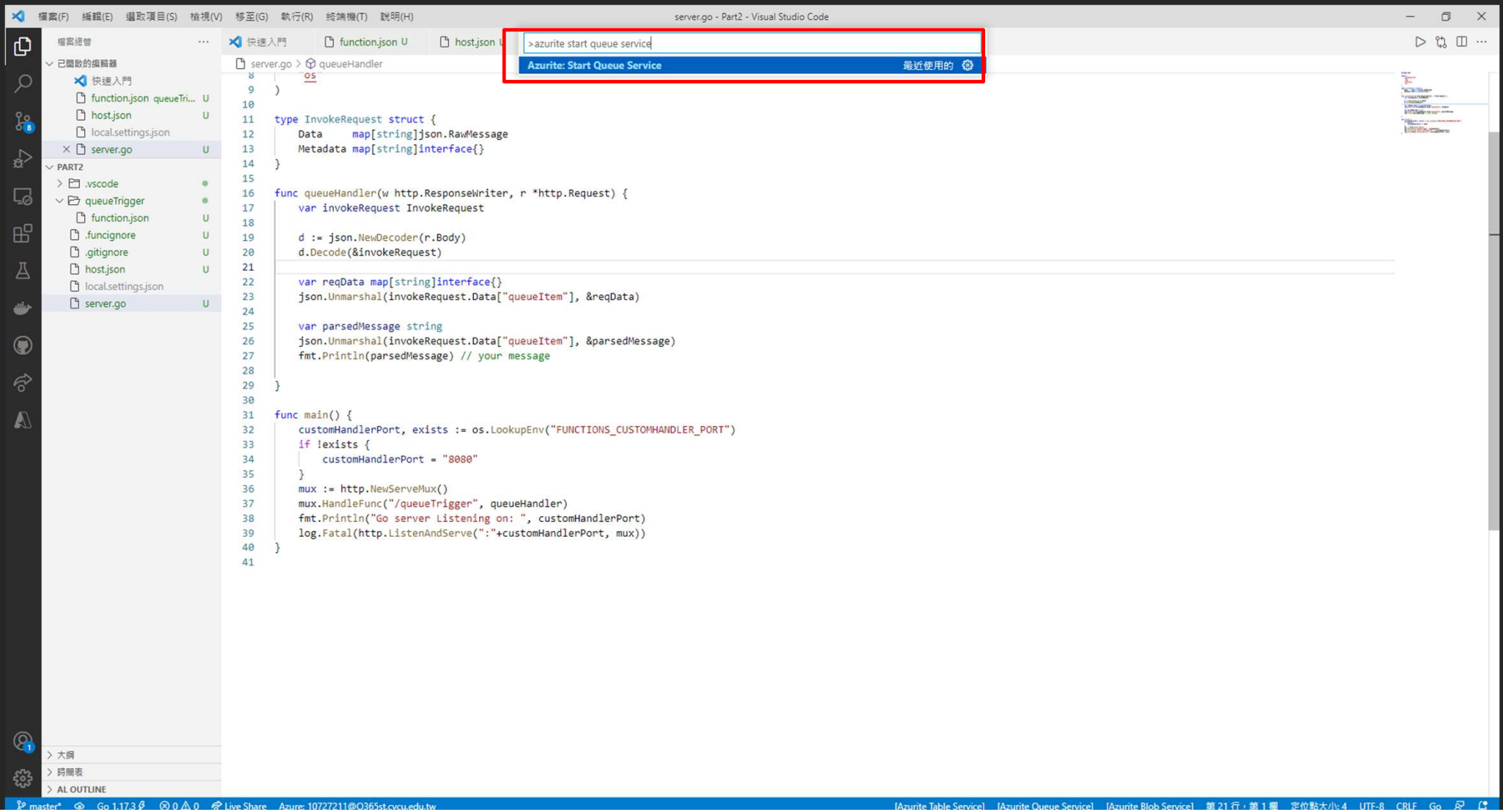
Configure the environment - 1



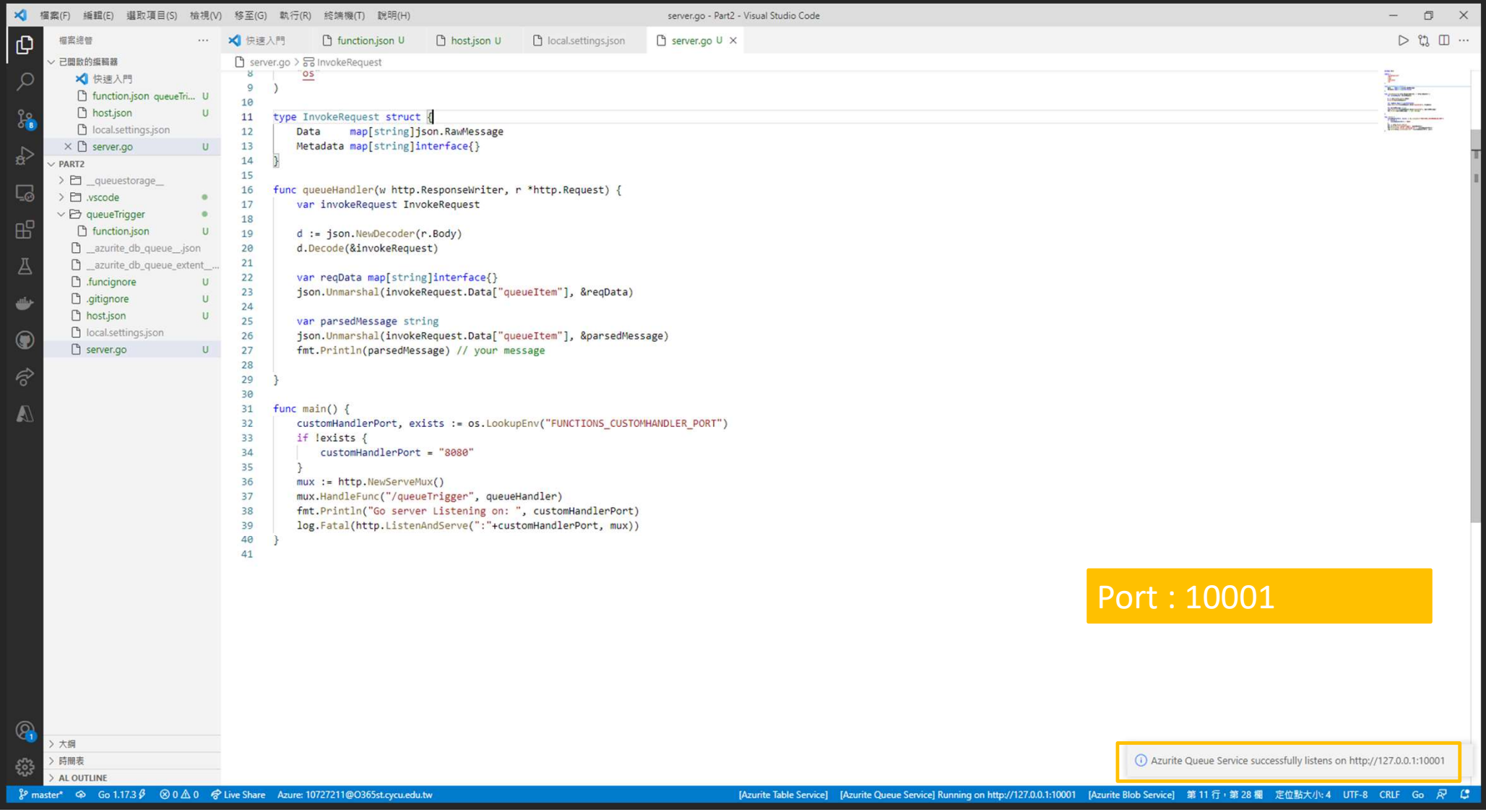
Configure the environment - 2



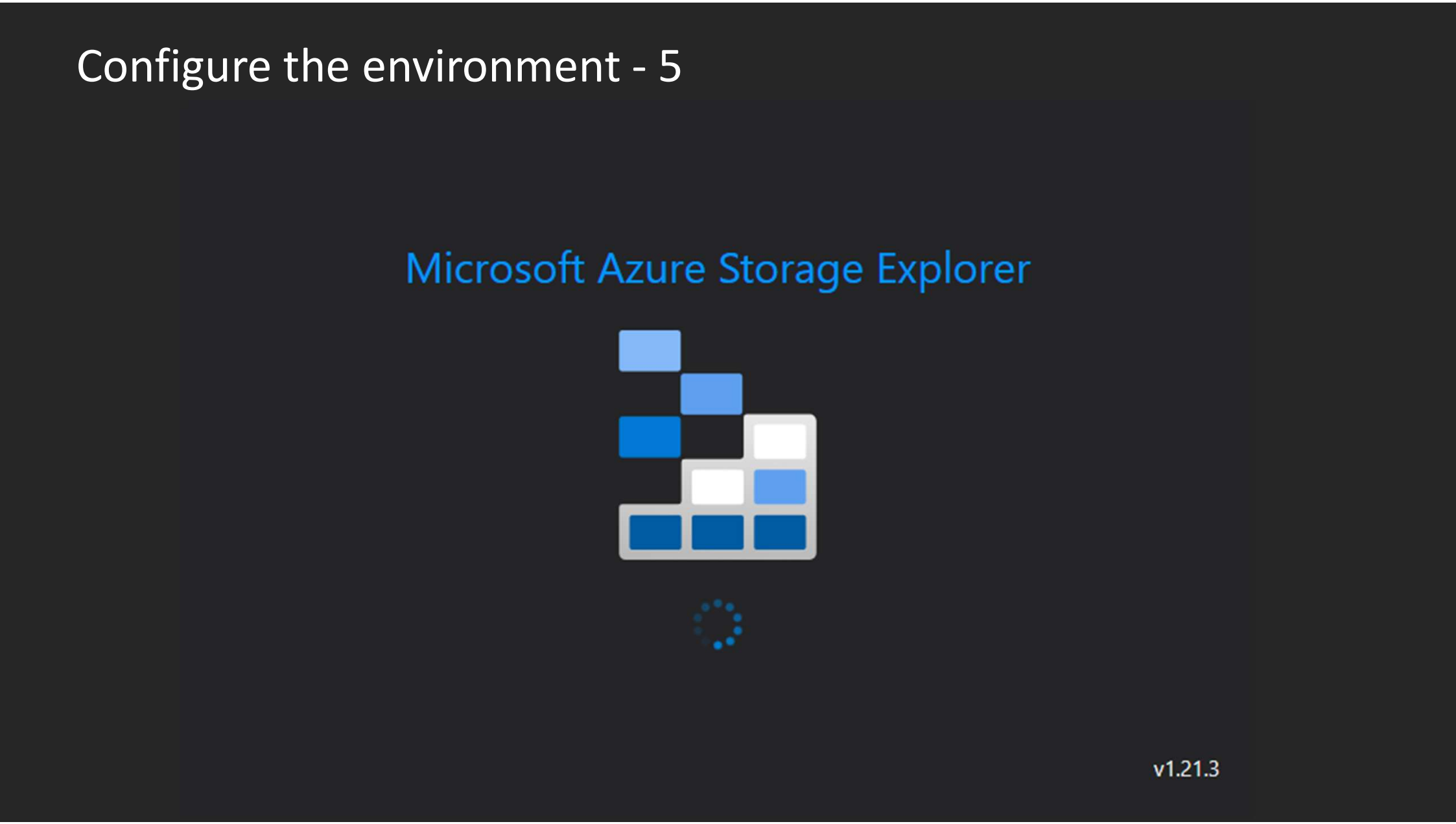
Configure the environment - 3



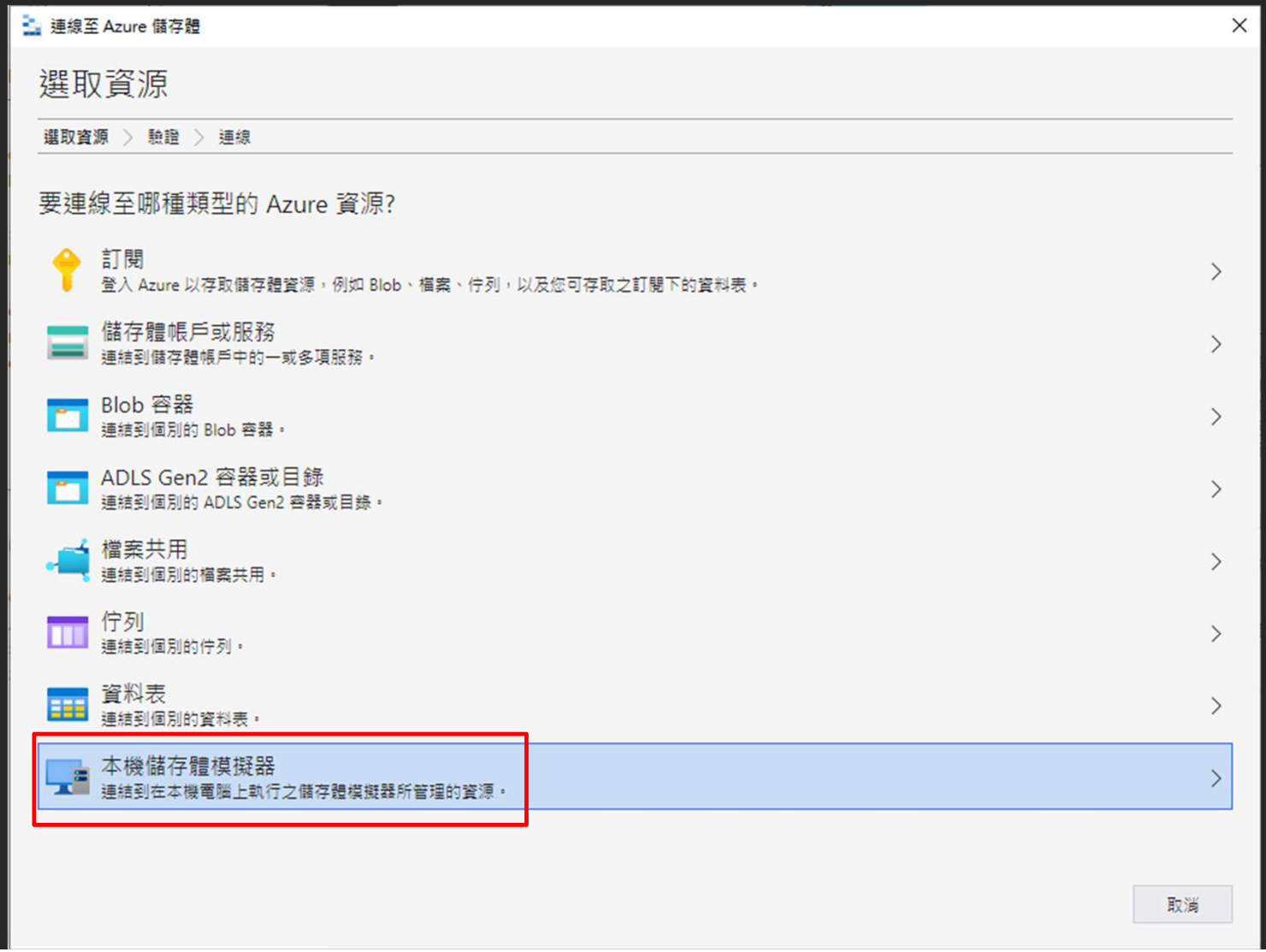
Configure the environment - 4



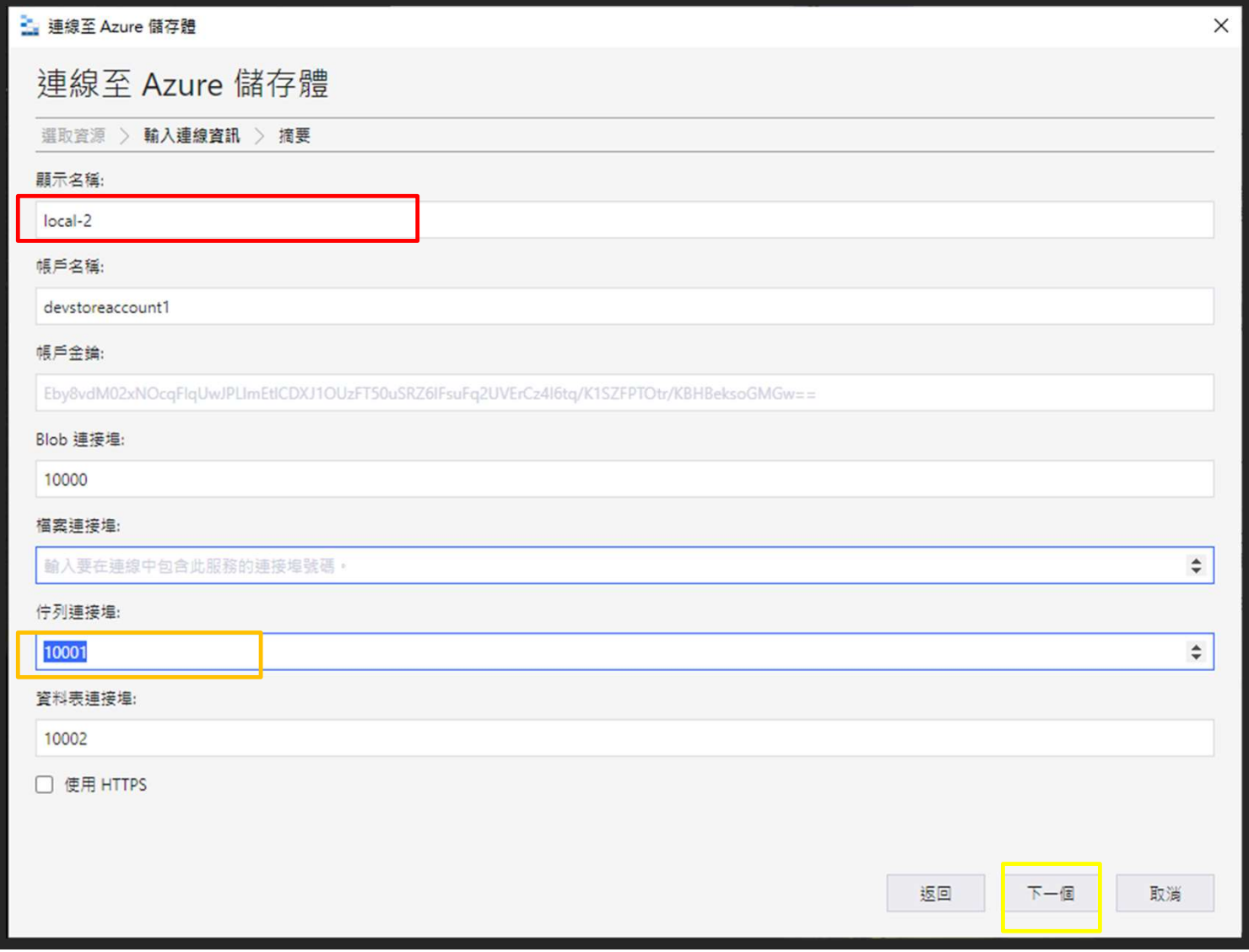
Configure the environment - 5



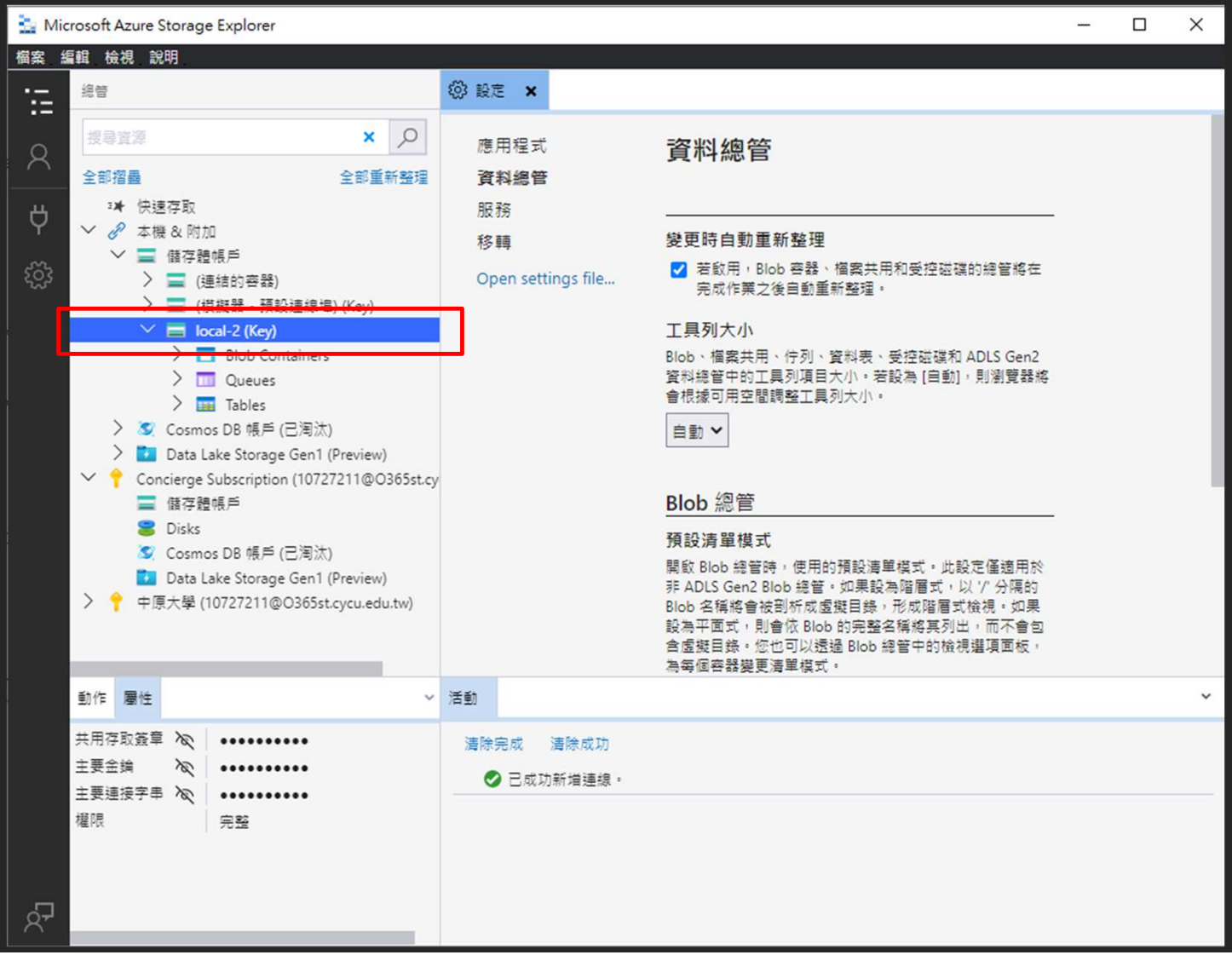
Configure the environment - 6



Configure the environment - 7



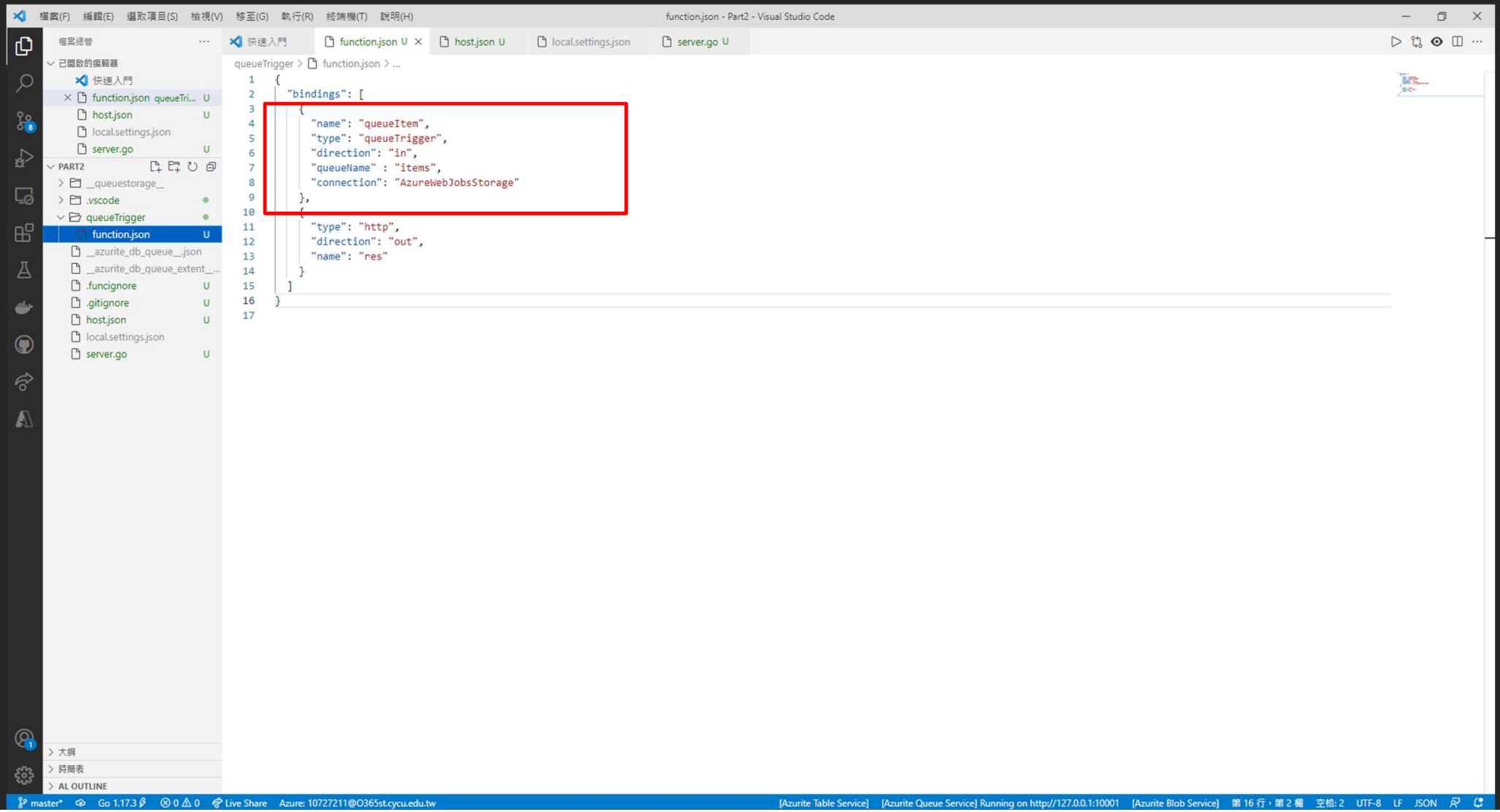
Configure the environment - 8



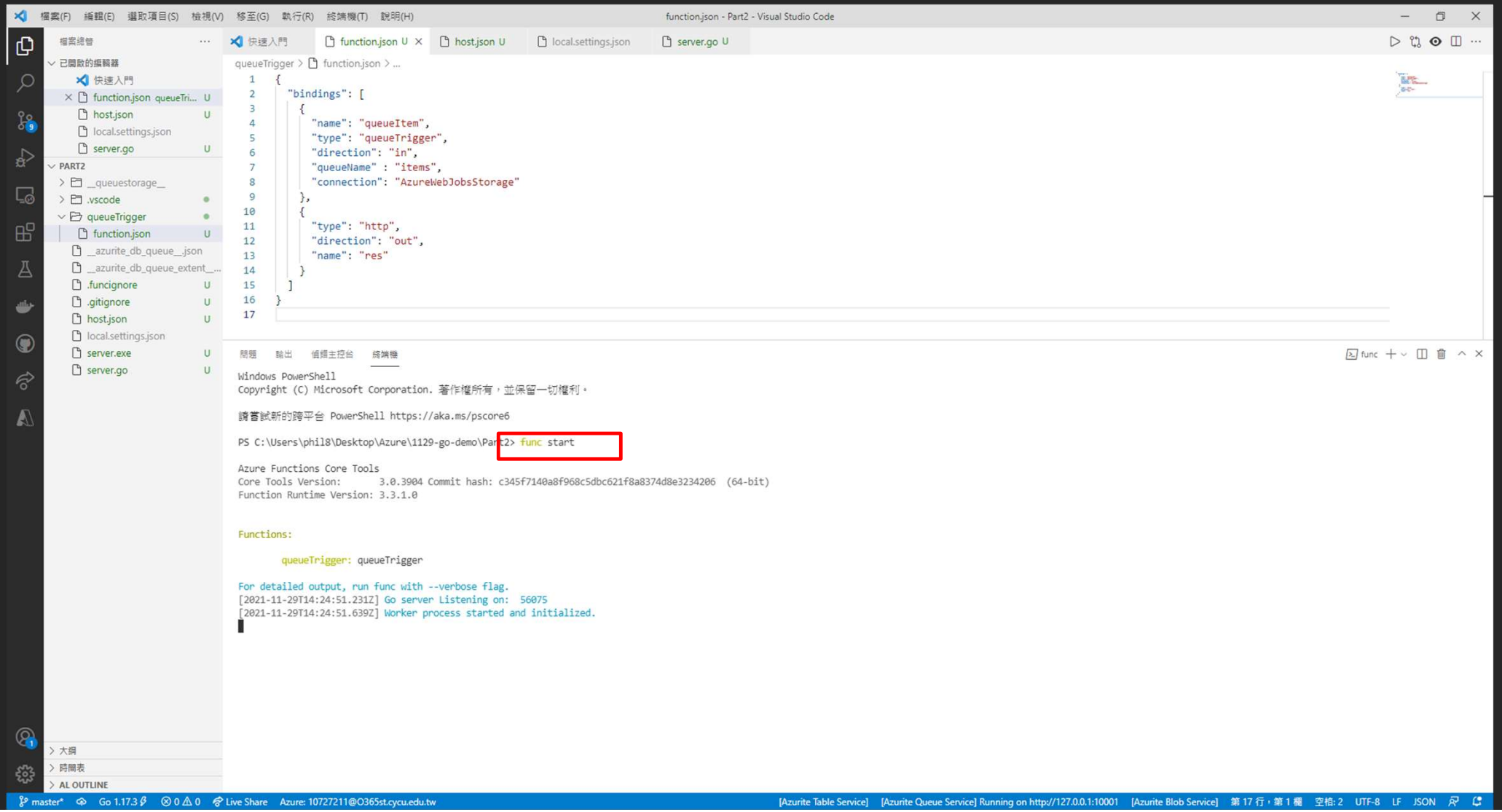
Configure the environment - 9

Configure the environment - 10

Configure the environment - 11



Run the app - 1


function.json - Part2 - Visual Studio Code
function.json
{
"bindings": [
{
"name": "queueItem",
"type": "queueTrigger",
"direction": "in",
"queueName" : "items",
"connection": "AzureWebJobsStorage"
},
{
"type": "http",
"direction": "out",
"name": "res"
}
]
}
Windows PowerShell
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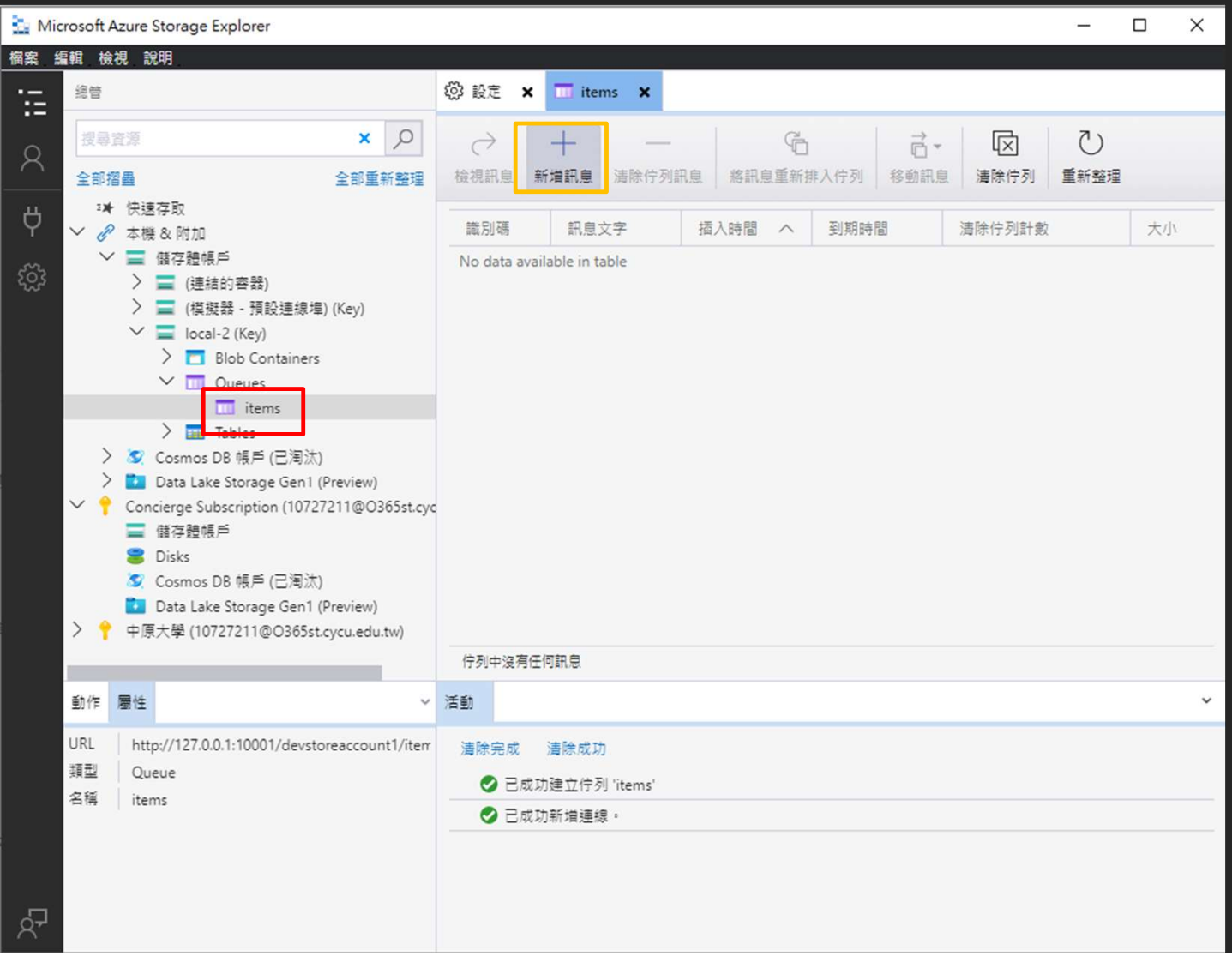
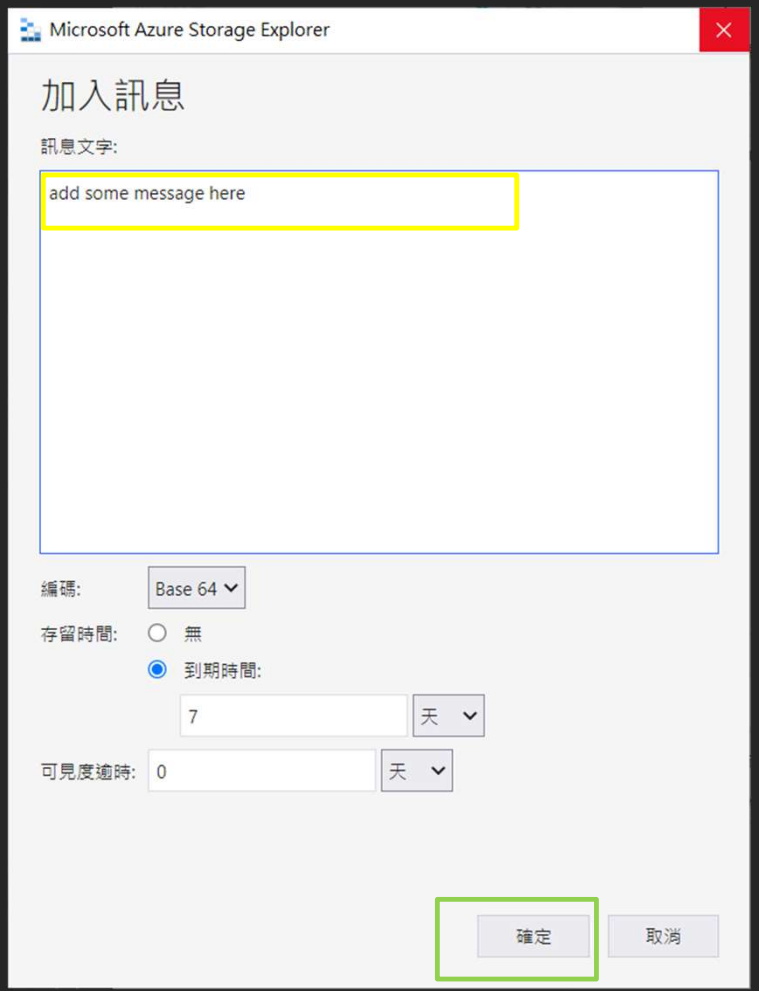
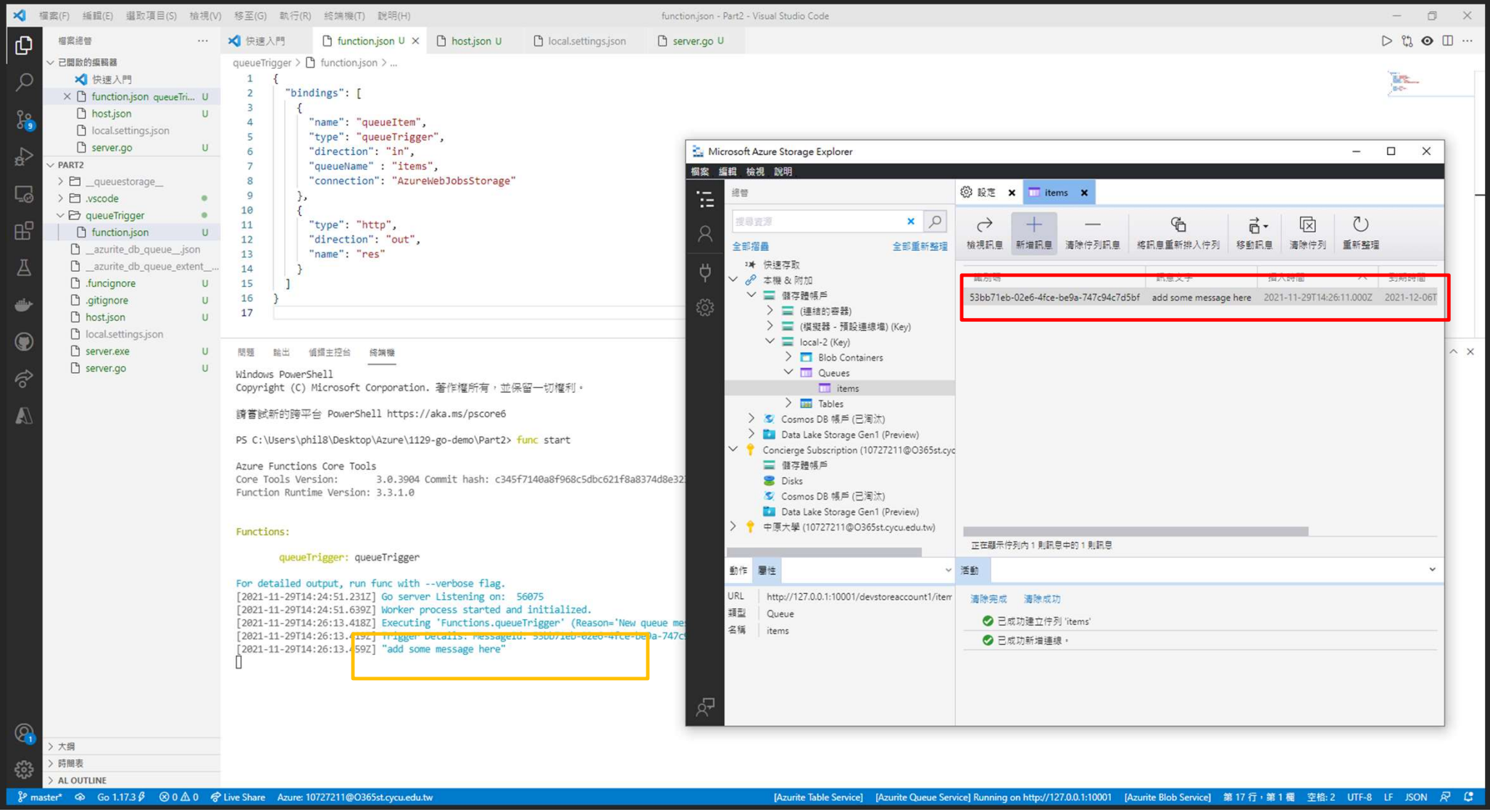
請嘗試新的跨平台 PowerShell https://aka.ms/pscore6
PS C:\Users\phil8\Desktop\Azure\1129-go-demo\Part2> func start
Azure Functions Core Tools
Core Tools Version: 3.0.3904 Commit hash: c345f7140a8f968c5dbc621f8a8374d8e3234206 (64-bit)
Function Runtime Version: 3.3.1.0
Functions:
queueTrigger: queueTrigger
For detailed output, run func with --verbose flag.
[2021-11-29T14:24:51.231Z] Go server Listening on: 56075
[2021-11-29T14:24:51.639Z] Worker process started and initialized.

Run the app - 2


Microsoft Azure Storage Explorer
檔案 編輯 檢視 說明
總管
設定
items
搜尋資源
全部摺疊
全部重新整理
快速存取
本機 & 附加
儲存體帳戶
(連結的容器)
(模擬器 - 預設連線埠) (Key)
local-2 (Key)
Blob Containers
Queues
items
Tables
Cosmos DB 帳戶 (已淘汰)
Data Lake Storage Gen1 (Preview)
Concierge Subscription (10727211@O365st.cyc
儲存體帳戶
Disks
Cosmos DB 帳戶 (已淘汰)
Data Lake Storage Gen1 (Preview)
中原大學 (10727211@O365st.cycu.edu.tw)
檢視訊息
新增訊息
清除佇列訊息
將訊息重新排入佇列
移動訊息
清除佇列
重新整理
識別碼
訊息文字
插入時間
到期時間
清除佇列計數
大小
No data available in table
佇列中沒有任何訊息
動作
屬性
活動
URL http://127.0.0.1:10001/devstoreaccount1/item
類型 Queue
名稱 items
清除完成
清除成功
已成功建立佇列 'items'
已成功新增連線。


Microsoft Azure Storage Explorer
加入訊息
訊息文字:
add some message here
編碼:
Base 64
存留時間:
無
到期時間:
7
天
可見度逾時:
0
天
確定
取消

Run the app - 3


function.json - Part2 - Visual Studio Code
function.json U
host.json U
local.settings.json
server.go U
queueTrigger > function.json > ...
{
"bindings": [
{
"name": "queueItem",
"type": "queueTrigger",
"direction": "in",
"queueName" : "items",
"connection": "AzureWebJobsStorage"
},
{
"type": "http",
"direction": "out",
"name": "res"
}
]
}
Microsoft Azure Storage Explorer
items
53bb71eb-02e6-4fce-be9a-747c94c7d5bf
add some message here
2021-11-29T14:26:11.000Z
2021-12-06T
Windows PowerShell
Copyright (C) Microsoft Corporation. 著作權所有，並保留一切權利。
PS C:\Users\phil8\Desktop\Azure\1129-go-demo\Part2> func start
Azure Functions Core Tools
Core Tools Version: 3.0.3904 Commit hash: c345f7140a8f968c5dbc621f8a8374d8e32
Function Runtime Version: 3.3.1.0
Functions:
queueTrigger: queueTrigger
For detailed output, run func with --verbose flag.
[2021-11-29T14:24:51.231Z] Go server Listening on: 56075
[2021-11-29T14:24:51.639Z] Worker process started and initialized.
[2021-11-29T14:26:13.418Z] Executing 'Functions.queueTrigger' (Reason='New queue me
[2021-11-29T14:26:13.459Z] "add some message here"

Thanks for your reading!