



**Computer Science Department**

**Cloud Computing and Data Security (COMP 4381)**

**Second Semester 2023/2024**

**Assignment 1 : Cloud computing Virtualization**

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**Student ID : 1212036**

**Section : 1**

**My VM Public IP address : 52.237.217.15**

## Step 1: Creating a Virtual Machine (VM):

So, the first thing I did was set up a virtual computer on Microsoft Azure. It's like having my own computer, but it's in the cloud instead of sitting on my desk. I chose a username and password to log in, just like I would for any other computer. Then, I picked the type of virtual machine I wanted, including the operating system (I chose Windows Server 2022 Datacenter) and how powerful I wanted it to be. It's kind of like setting up my bakery's workspace in the cloud.

Microsoft Azure

Home > Free account virtual machine >

### Create a virtual machine

Basics Tags Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

**Project details**

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \* Azure for Students

Resource group \* (New) majdhamarshah

[Create new](#)

**Instance details**

Virtual machine name \* MajdVM2024

Region \* (Asia Pacific) Australia East

Image \* [smalldisk] Windows Server 2022 Datacenter: Azure Edition - x64 Gen2

< Previous Next : Tags > Review + create

[Give feedback](#)

Type here to search

57°F Mostly cloudy 22:51 18/04/2024

Welcome

Create a virtual machine - Mic

New Tab

portal.azure.com/?Microsoft\_Azure\_Education\_correlationId=3652cc0a-97a6-4487-8ca2-d712d8a88a9e&Microsoft\_Azure\_Education\_newA4E=true&Microsoft\_Azure\_Education\_asoSubGui...

Microsoft Azure

Search resources, services, and docs (G+I)

1212036@student.birzei...  
DEFAULT DIRECTORY

Home > Free account virtual machine >

Create a virtual machine

Size \*  
Standard\_B1s - 1 vcpu, 1 GiB memory (\$12.56/month) (free services eligible)

Administrator account  
Username \*  
1212036  
Password \*  
.....  
Confirm password \*  
.....

Inbound port rules  
Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.  
Public inbound ports \*  
☐ None  
☒ Allow selected ports  
Select inbound ports \*  
RDP (3389)  

All traffic from the internet will be blocked by default. You will be able to change inbound port rules in the VM > Networking page.

< Previous

Next: Tags >

Review + create

Give feedback

Type here to search

57°F Mostly cloudy

ENG

22:53

18/04/2024

Welcome

Create a virtual machine - Mic

New Tab

portal.azure.com/?Microsoft\_Azure\_Education\_correlationId=3652cc0a-97a6-4487-8ca2-d712d8a88a9e&Microsoft\_Azure\_Education\_newA4E=true&Microsoft\_Azure\_Education\_asoSu...

Microsoft Azure

Search resources, services, and docs (G+I)

1212036@student.birzei...  
DEFAULT DIRECTORY

Home > Free account virtual machine >

Create a virtual machine

Validation passed

Basics Tags Review + create

Cost given below is an estimate and not the final price. Please use [Pricing calculator](#) for all your pricing needs.

Price  
1 X Standard B1s  
by Microsoft  
[Terms of use](#) | [Privacy policy](#)  
Subscription credits apply  
**0.0172 USD/hr**  
[Pricing for other VM sizes](#)

TERMS  
By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. See the [Azure Marketplace Terms](#) for additional details.

< Previous

Next >

Create

Download a template for automation

Give feedback

Type here to search

Earnings upcoming

ENG

23:08

18/04/2024

Welcome

Create a virtual machine - Micro

+

portal.azure.com/?Microsoft\_Azure\_Education\_correlationId=3652cc0a-97a6-4487-8ca2-d712d8a88a9e&Microsoft\_Azure\_Education\_newA4E=true&Microsoft\_Azure\_Education\_asoSu...

Microsoft Azure

Search resources, services, and docs (G+)

1212036@student.birzei...  
DEFAULT DIRECTORY

Home > Free account virtual machine >

Create a virtual machine

Validation passed

By clicking "Create", I (a) agree to the legal terms and privacy statement(s) associated with the Marketplace offering(s) listed above; (b) authorize Microsoft to bill my current payment method for the fees associated with the offering(s), with the same billing frequency as my Azure subscription; and (c) agree that Microsoft may share my contact, usage and transactional information with the provider(s) of the offering(s) for support, billing and other transactional activities. Microsoft does not provide rights for third-party offerings. See the [Azure Marketplace Terms](#) for additional details.

**You have set RDP port(s) open to the internet.** This is only recommended for testing. If you want to change this setting, go back to Basics tab.

Basics

Subscription

Azure for Students

Resource group

(new) majdhamarsheh

Virtual machine name

MajdVM2024

Region

Australia East

Image

[smalldisk] Windows Server 2022 Datacenter: Azure Edition - Gen2

Size

Standard B1s (1 vcpu, 1 GiB memory)

Username

1212036

Public inbound ports

RDP

< Previous

Next >

Create

Download a template for automation

Give feedback

Type here to search

Earnings upcoming

23:09  
18/04/2024

Welcome

CreateVm-MicrosoftWindowsSe

+

portal.azure.com/?Microsoft\_Azure\_Education\_correlationId=3652cc0a-97a6-4487-8ca2-d712d8a88a9e&Microsoft\_Azure\_Education\_newA4E=true&Microsoft\_Azure\_Education\_...

Microsoft Azure

Search resources, services, and docs (G+)

1212036@student.birzei...  
DEFAULT DIRECTORY

Home >

CreateVm-MicrosoftWindowsServer.WindowsServer-202-20240418224536 | Overview

Deployment

Search

Delete

Cancel

Redeploy

Download

Refresh

Overview

Inputs

Outputs

Template

✓ Your deployment is complete

Deployment name: CreateVm-MicrosoftWindowsServer.WindowsSe...

Subscription: Azure for Students

Resource group: majdhamarsheh

Start time: 4/18/2024, 11:10:06 PM

Correlation ID: df6d774c-489e-49f6-826f-dc040bffb72e

Deployment details

Resource	Type	Status	Operation details
✓ MajdVM2024	Microsoft.Compute/virtualMachi...	OK	<a href="#">Operation details</a>
✓ majdvm2024774	Microsoft.Network/networkInterf...	Created	<a href="#">Operation details</a>
✓ MajdVM2024-vnet	Microsoft.Network/virtualNetworks	OK	<a href="#">Operation details</a>
✓ MajdVM2024-ip	Microsoft.Network/publicIpAddr...	OK	<a href="#">Operation details</a>
✓ MajdVM2024-nsg	Microsoft.Network/networkSecur...	OK	<a href="#">Operation details</a>

Next steps

Setup auto-shutdown

Recommended

Monitor VM health, performance and network dependencies

Recommended

Run a script inside the virtual machine

Recommended

Go to resource

Create another VM

Cost Management

Get notified to stay within your budget and prevent unexpected charges on your bill.

[Set up cost alerts >](#)

Microsoft Defender for Cloud

Secure your apps and infrastructure

[Go to Microsoft Defender for Cloud >](#)

Free Microsoft tutorials

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Work with an expert

Azure experts are service provider partners who can help manage your assets on Azure and be your first line of support.

[Find an Azure expert >](#)

Type here to search

57°F Mostly cloudy

23:16  
18/04/2024

Microsoft Azure portal showing the overview of a virtual machine named **MajdVM2024**.

**Overview**

**Essentials**

- Resource group (move): [majdhamarshah](#)
- Status: Running
- Location: Australia East
- Subscription (move): [Azure for Students](#)
- Subscription ID: 7dca6745-b046-4d6f-a28a-dac45d5d92e5
- Operating system: Windows (Windows Server 2022 Datacenter Azure Edition)
- Size: Standard B1s (1 vcpu, 1 GiB memory)
- Public IP address: [52.237.217.15](#)
- Virtual network/subnet: [MajdVM2024-vnet/default](#)
- DNS name: [Not configured](#)
- Health state: -

**Properties**

**Virtual machine**

- Computer name: MajdVM2024
- Operating system: Windows (Windows Server 2022 Datacenter Azure Edition)
- Image publisher: MicrosoftWindowsServer
- Image offer: WindowsServer
- Image plan: 2022-datacenter-azure-edition-smalldisk
- VM generation: V2
- VM architecture: x64
- Agent status: Ready

**Networking**

- Public IP address: [52.237.217.15](#) (Network interface [majdvm2024774](#))
- Public IP address (IPv6): -
- Private IP address: 10.1.1.4
- Private IP address (IPv6): -
- Virtual network/subnet: [MajdVM2024-vnet/default](#)
- DNS name: [Configure](#)

**Size**

Microsoft Azure portal showing the overview of a virtual machine named **MajdVM2024**.

**Overview**

**Essentials**

- VM generation: V2
- VM architecture: x64
- Agent status: Ready
- Agent version: 2.7.41491.1095
- Hibernation: Disabled
- Host group: -
- Host: -
- Proximity placement group: -
- Colocation status: N/A
- Capacity reservation group: -
- Disk controller type: SCSI
- DNS name: [Configure](#)
- Size: Standard B1s
- Size: Standard B1s
- vCPUs: 1
- RAM: 1 GiB
- Disk: MajdVM2024\_OsDisk\_1\_e17a28ee6c364e709e5b4f13a5a28a1f
- Encryption at host: Disabled
- Azure disk encryption: Not enabled
- Ephemeral OS disk: N/A
- Data disks: 0
- Auto-shutdown: Not enabled
- Scheduled shutdown: -
- Azure Spot: -
- Azure Spot eviction policy: -

**Availability + scaling**

- Availability zone (edit): -
- Availability set: -
- Scale Set: -

**Security type**

- Security type: Standard

**Health monitoring**

- Health monitoring: Not enabled

The screenshot displays the Microsoft Azure portal interface. The top navigation bar shows the user is logged in as '1212036@student.birzei...'. The main content area is titled 'MajdVM2024' and shows the 'Overview' tab. The 'Essentials' section provides key information about the VM:

- Resource group:** [majdhamarsheh](#)
- Status:** Running
- Location:** Australia East
- Subscription:** [Azure for Students](#)
- Subscription ID:** 7dca6745-b046-4d6f-a28a-dac45d5d92e5
- Operating system:** Windows (Windows Server 2022 Datacenter Azure Edition)
- Size:** Standard B1s (1 vcpu, 1 GiB memory)
- Public IP address:** [52.237.217.15](#)
- Virtual network/subnet:** [MajdVM2024-vnet/default](#)
- DNS name:** [Not configured](#)
- Health state:** -

The 'Properties' tab is selected, showing details for the 'Virtual machine' and 'Networking' sections.

**Virtual machine properties:**

- Computer name:** MajdVM2024
- Operating system:** Windows (Windows Server 2022 Datacenter Azure Edition)
- Image publisher:** MicrosoftWindowsServer
- Image offer:** WindowsServer
- Image plan:** 2022-datacenter-azure-edition-smalldisk
- VM generation:** V2
- VM architecture:** x64
- Agent status:** Ready

**Networking properties:**

- Public IP address:** [52.237.217.15](#) ( Network interface [majdvm2024774](#) )
- Public IP address (IPv6):** -
- Private IP address:** 10.1.1.4
- Private IP address (IPv6):** -
- Virtual network/subnet:** [MajdVM2024-vnet/default](#)
- DNS name:** [Configure](#)

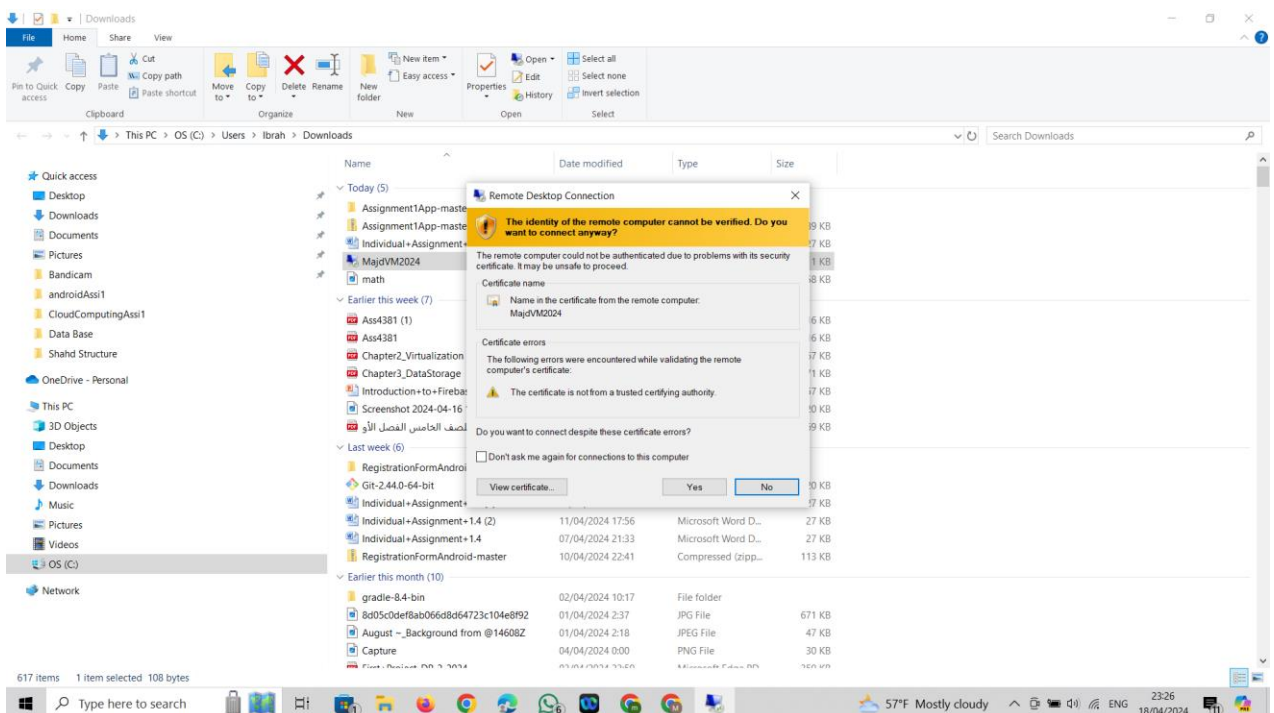
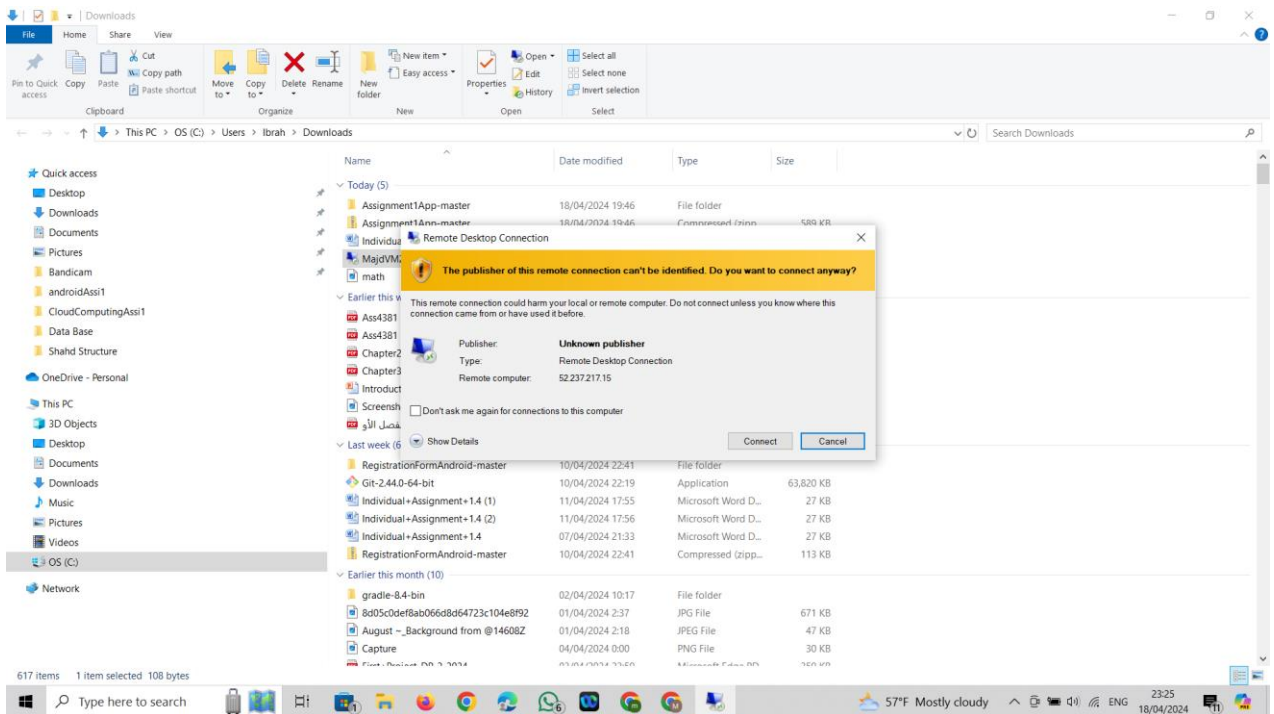
The bottom of the screen shows a Windows taskbar with various application icons and a system tray indicating the time as 23:18 on 18/04/2024.

## Step 2: Connecting to my VM:

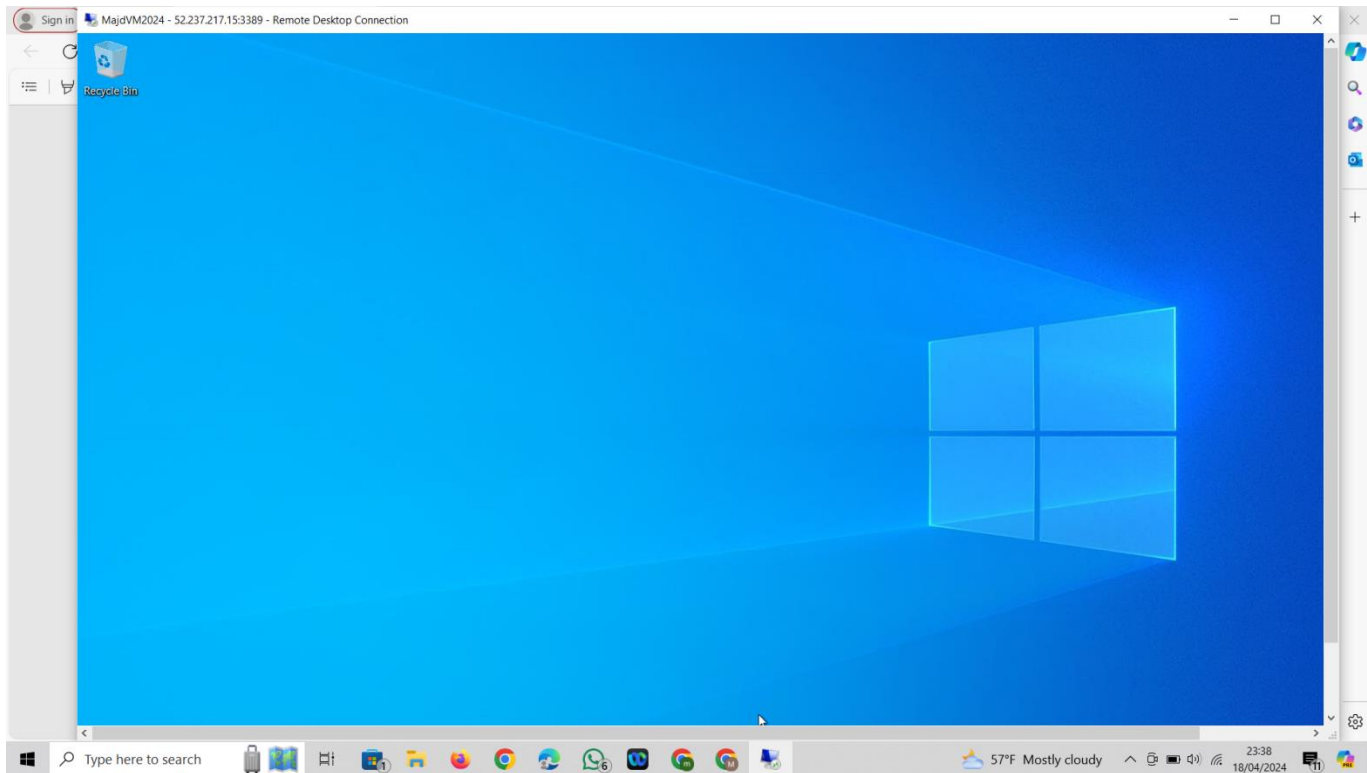
After setting up the virtual machine, I needed a way to actually access it. It's like having a bakery kitchen in the clouds, but I need a way to get inside. So, I used a tool called Remote Desktop Protocol (RDP) or Secure Shell (SSH) to remotely connect to my virtual machine from my own computer. It's like having a magical key to unlock the door to my bakery kitchen from wherever I am.

Microsoft Azure portal interface showing the 'MajdVM2024' virtual machine details. The page is titled 'MajdVM2024 | Connect' and displays connection options for a Windows Server VM. The 'Connect' section is active, showing the 'Public IP address' as 52.237.217.15. The 'Most common' section highlights 'Native RDP' as the recommended connection method, with a 'Download RDP file' button. The 'More ways to connect (4)' section is also visible. The left sidebar shows navigation options like Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Connect, Bastion, Windows Admin Center, Networking, Network settings, Load balancing, Application security groups, Network manager, Settings, Disks, and Extensions + applications. The top navigation bar includes the Microsoft Azure logo, search bar, and user profile (1212036@student.birzei...).

Microsoft Azure portal interface showing the 'MajdVM2024' virtual machine details, with a 'Native RDP' connection window open. The 'Native RDP' window displays a list of prerequisites for connecting to the VM, including 'Configure prerequisites for Native RDP', 'Open Remote Desktop Connection (on Windows)', and 'Download and open the RDP file'. The 'Configure prerequisites for Native RDP' section shows that the 'Public IP address' (52.237.217.15) is required for connection. The 'Open Remote Desktop Connection (on Windows)' section provides instructions on how to connect to the VM. The 'Download and open the RDP file' section shows the 'Download RDP file' button. The 'Other Information' section includes a 'Close' button and a 'Give feedback' link. The left sidebar and top navigation bar are identical to the previous screenshot.

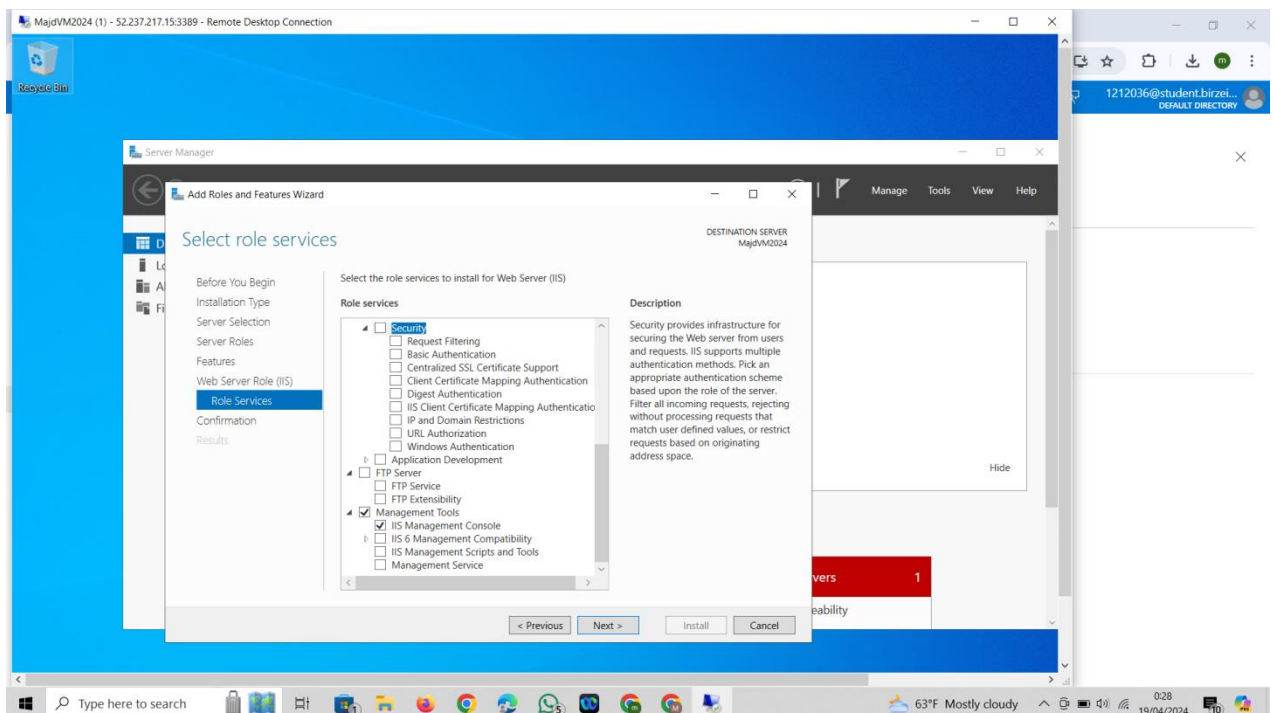
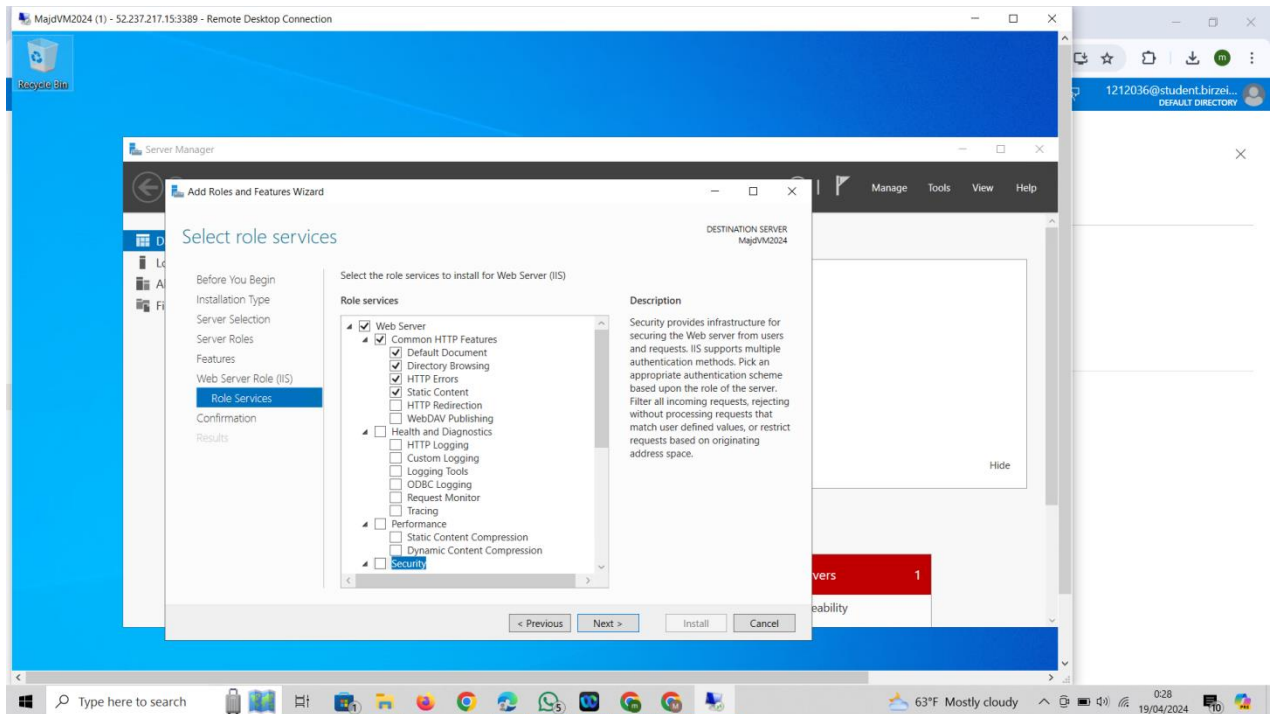


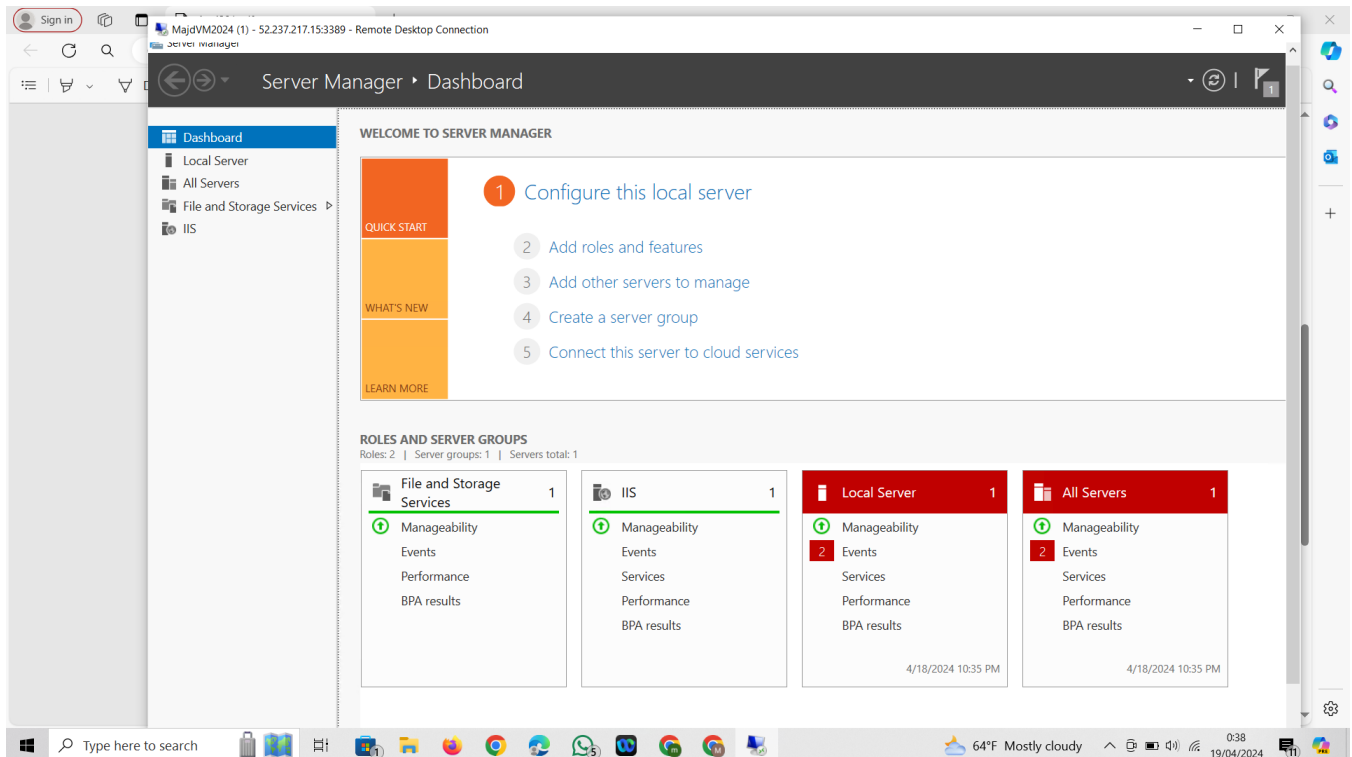
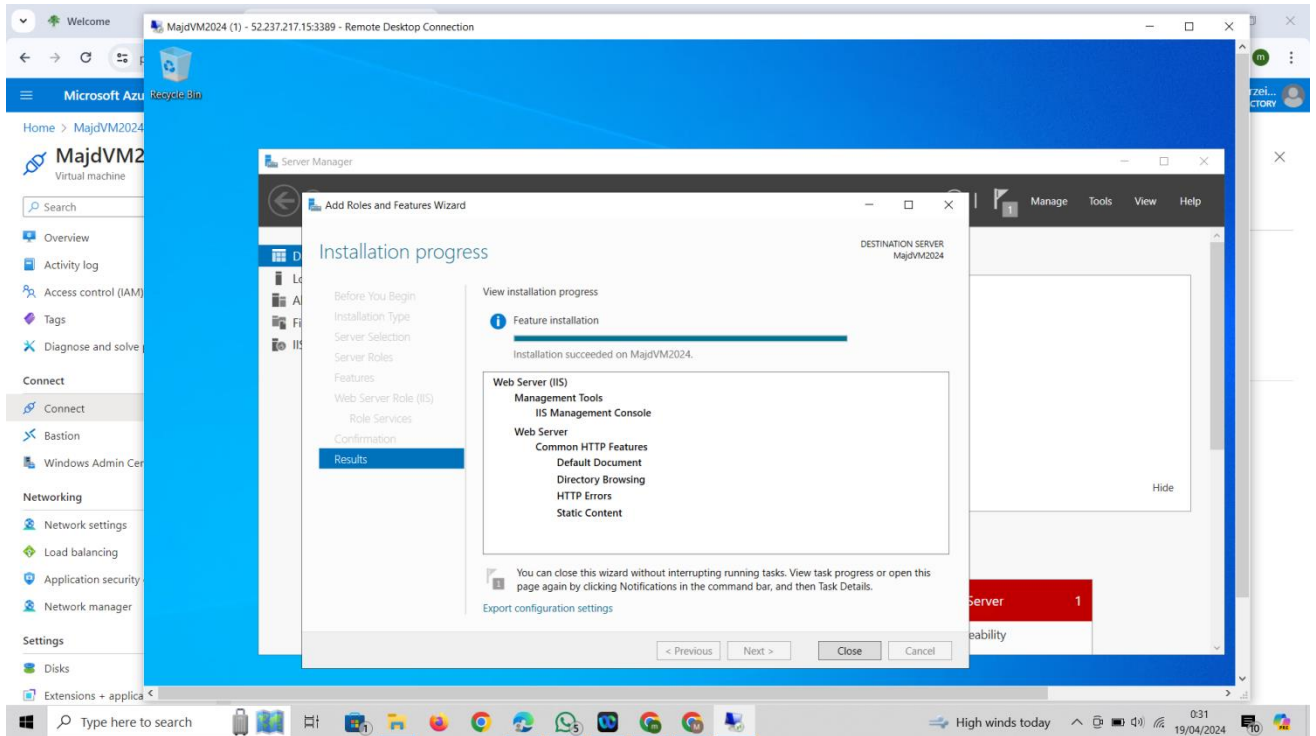




### **Step 3: Installing a Web Server:**

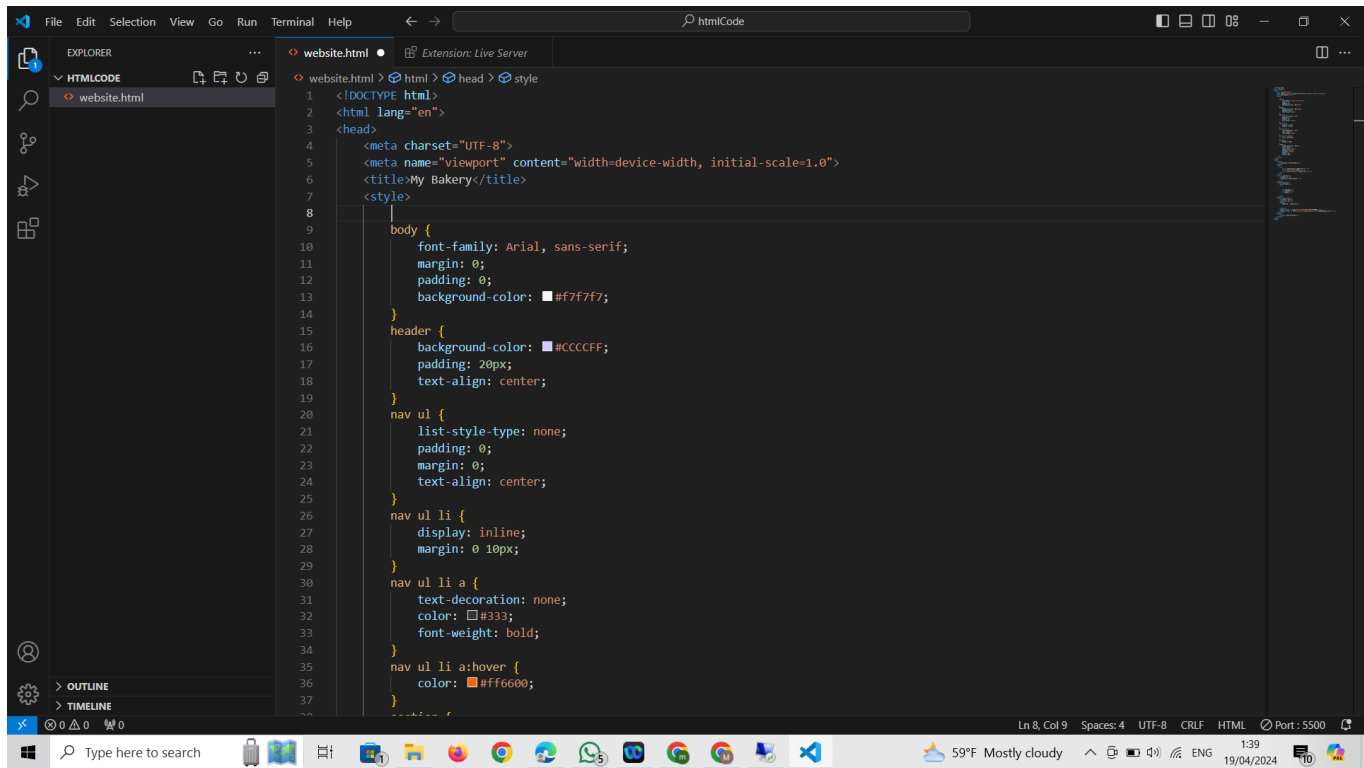
Once I was inside the virtual machine, it was time to install software that could serve my bakery's website to visitors. I chose to install a web server, which is basically like setting up a display counter in my bakery where customers can see all the tasty treats. I installed Internet Information Services (IIS), which is like the engine that powers the website and makes sure everything runs smoothly.





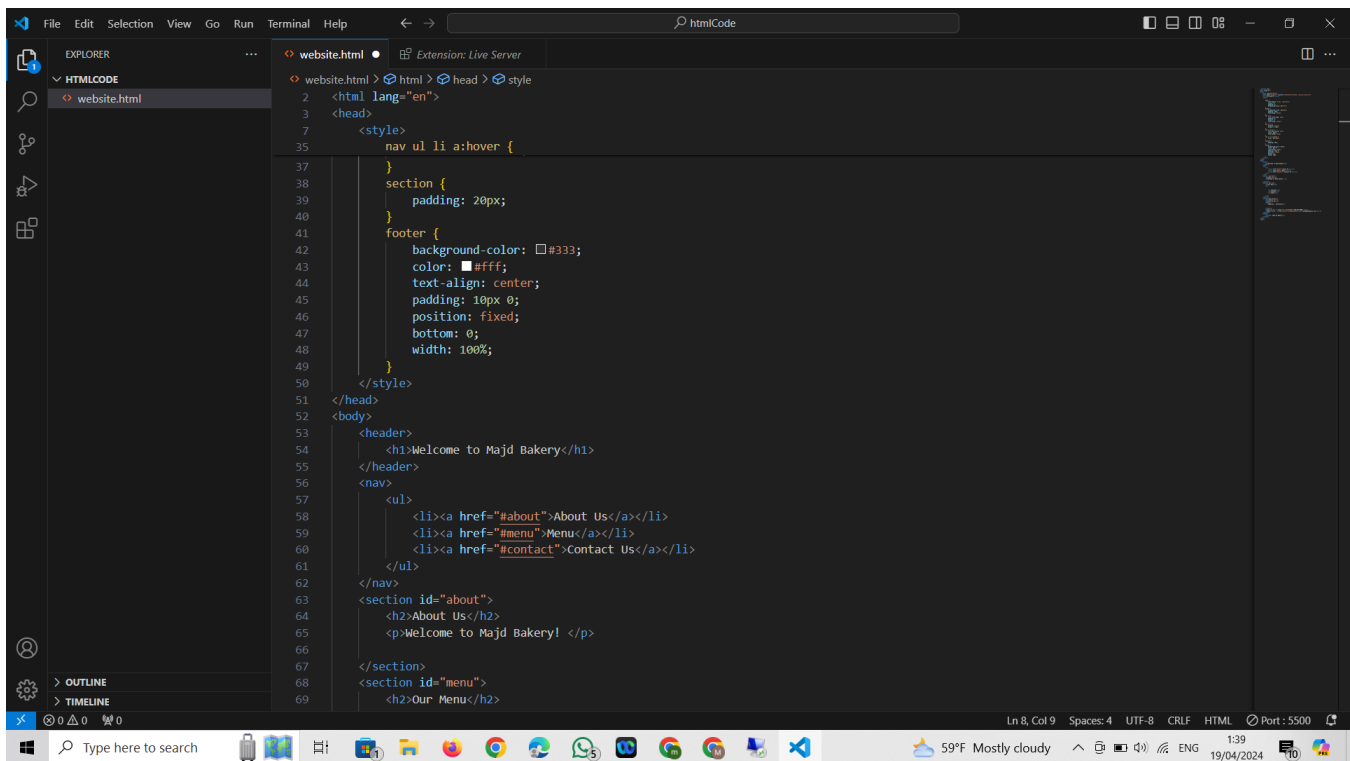
## Step 4: Creating a Simple Webpage:

With the web server installed, it was time to create my bakery's website. I used a basic code editor like Visual Studio Code to write the code for the webpage. I included information about my bakery, some pictures of my delicious treats, and how customers can get in touch with me. It's kind of like creating a menu board for my bakery so people know what's available.

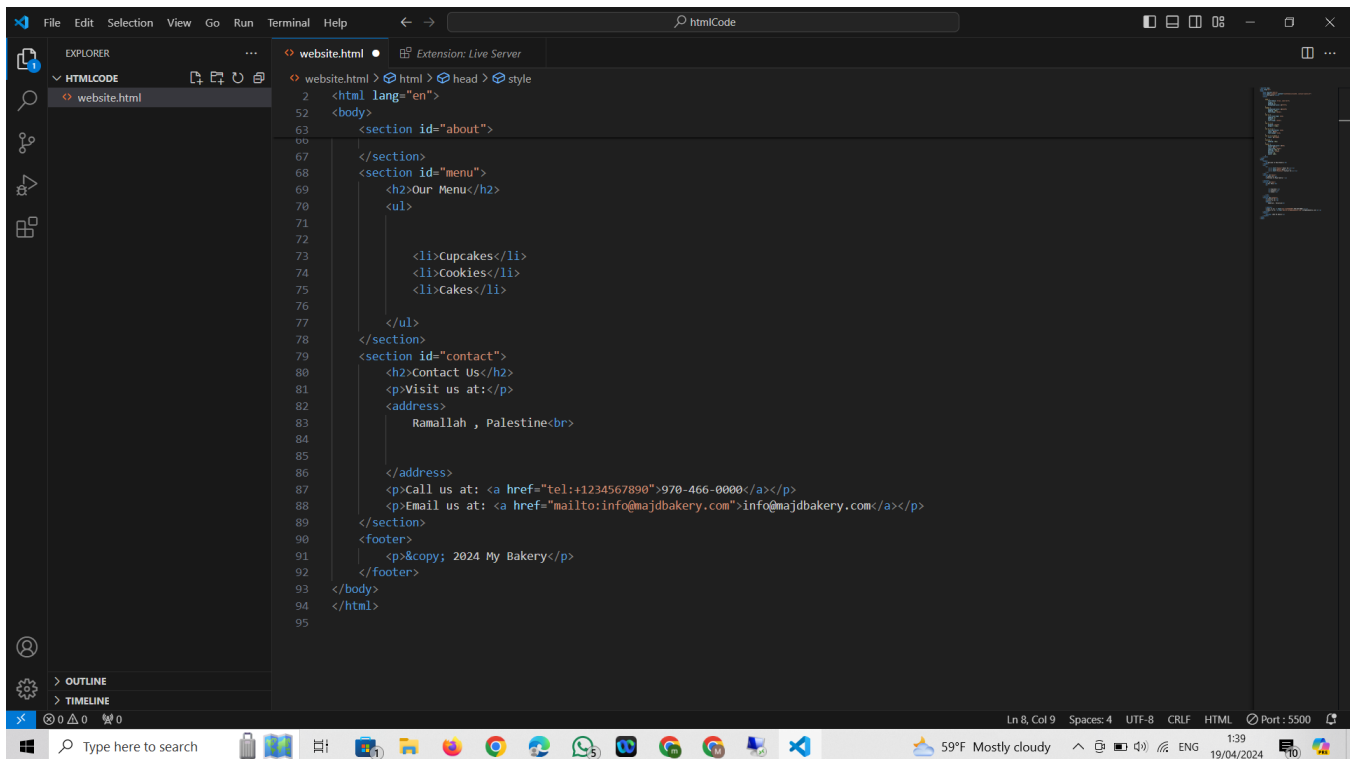


The screenshot shows the Visual Studio Code editor with a file named `website.html` open. The code is a simple HTML document with embedded CSS. The CSS defines a body with a light blue background, a white header with a pink background, and a navigation menu with blue links. The page title is "My Bakery".

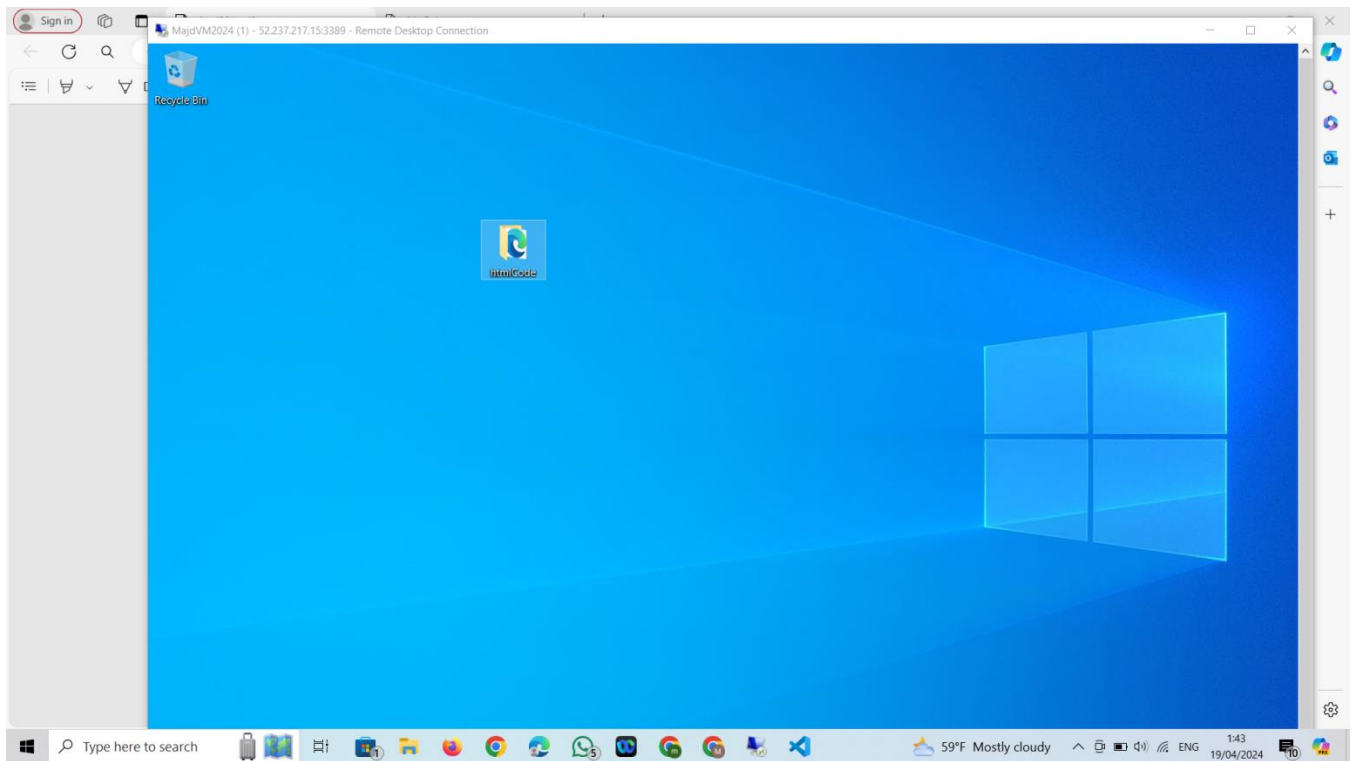
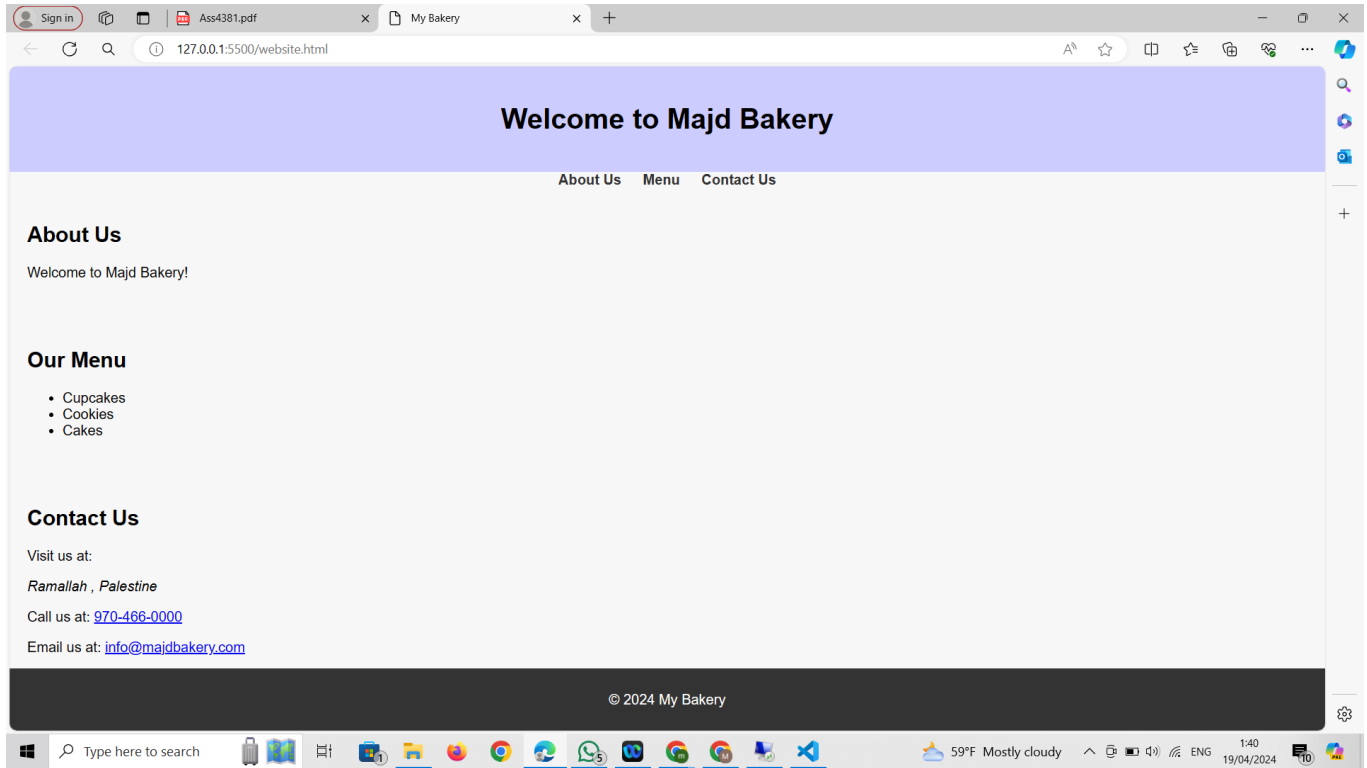
```
1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <meta name="viewport" content="width=device-width, initial-scale=1.0">
6   <title>My Bakery</title>
7   <style>
8     body {
9       font-family: Arial, sans-serif;
10      margin: 0;
11      padding: 0;
12      background-color: #f7f7f7;
13    }
14    header {
15      background-color: #ccccff;
16      padding: 20px;
17      text-align: center;
18    }
19    nav ul {
20      list-style-type: none;
21      padding: 0;
22      margin: 0;
23      text-align: center;
24    }
25    nav ul li {
26      display: inline;
27      margin: 0 10px;
28    }
29    nav ul li a {
30      text-decoration: none;
31      color: #333;
32      font-weight: bold;
33    }
34    nav ul li a:hover {
35      color: #ff6600;
36    }
37  </style>
38 </head>
39 <body>
40 </body>
41 </html>
```



```
1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4 <title>Majd Bakery</title>
5 <meta charset="UTF-8">
6 <meta name="viewport" content="width=device-width, initial-scale=1.0">
7 <style>
8   nav ul li a: hover {
9     color: #000080;
10    text-decoration: underline;
11  }
12  section {
13    padding: 20px;
14  }
15  footer {
16    background-color: #333;
17    color: #fff;
18    text-align: center;
19    padding: 10px 0;
20    position: fixed;
21    bottom: 0;
22    width: 100%;
23  }
24 </style>
25 </head>
26 <body>
27 <header>
28 <h1>Welcome to Majd Bakery</h1>
29 </header>
30 <nav>
31 <ul>
32 <li><a href="#about">About Us</a></li>
33 <li><a href="#menu">Menu</a></li>
34 <li><a href="#contact">Contact Us</a></li>
35 </ul>
36 </nav>
37 <section id="about">
38 <h2>About Us</h2>
39 <p>Welcome to Majd Bakery! </p>
40 </section>
41 <section id="menu">
42 <h2>Our Menu</h2>
```

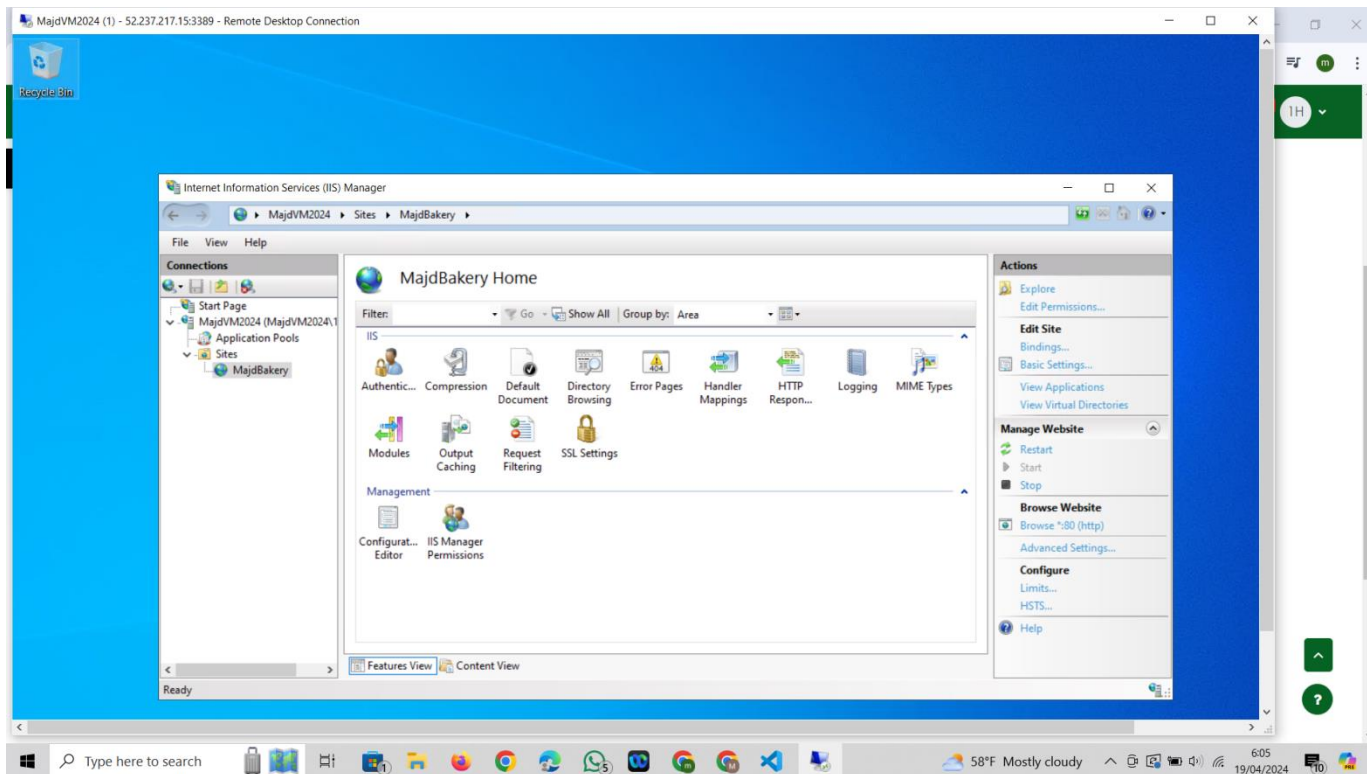


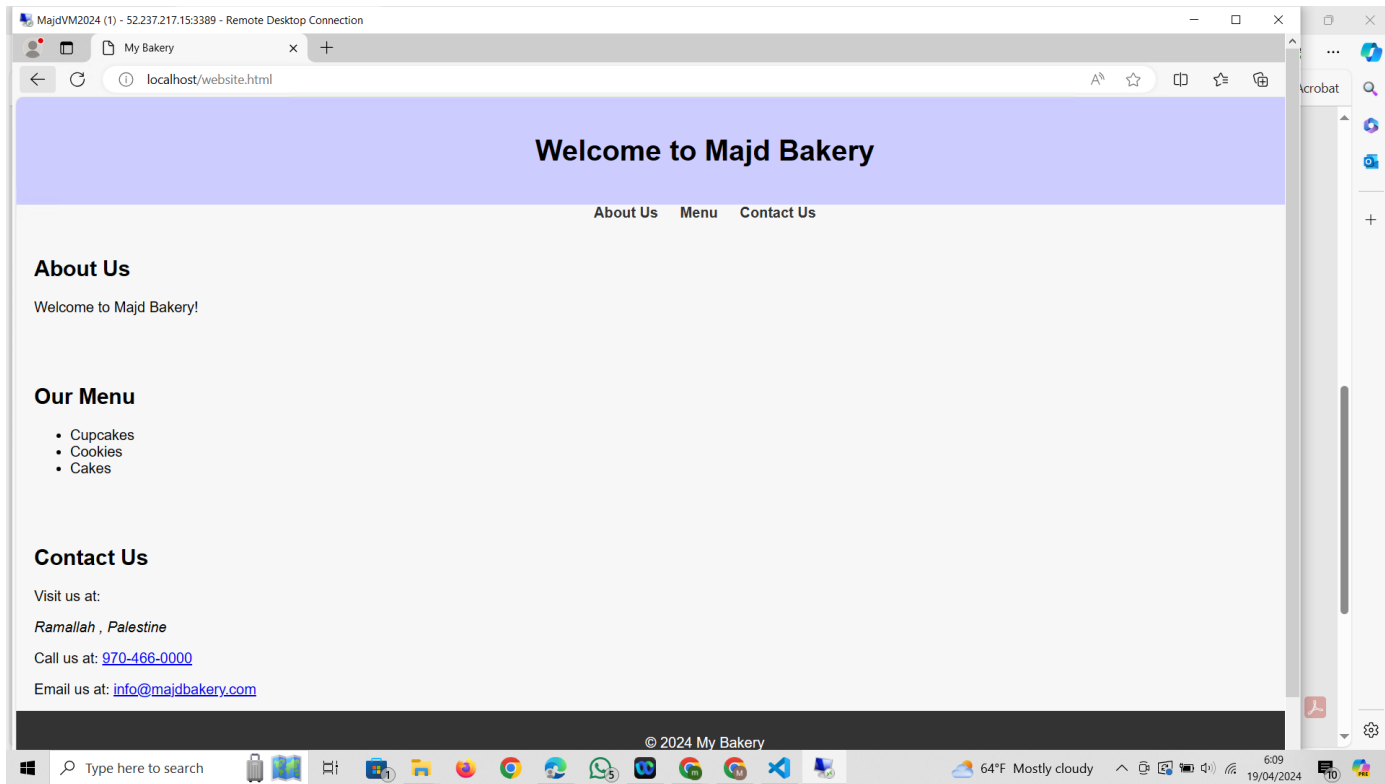
```
43 <ul>
44 <li>Cupcakes</li>
45 <li>Cookies</li>
46 <li>Cakes</li>
47 </ul>
48 </section>
49 <section id="contact">
50 <h2>Contact Us</h2>
51 <p>Visit us at:</p>
52 <address>
53   Ramallah , Palestine<br>
54 </address>
55 <p>Call us at: <a href="tel:+1234567890">970-466-0000</a></p>
56 <p>Email us at: <a href="mailto:info@majdbakery.com">info@majdbakery.com</a></p>
57 </section>
58 <footer>
59 <p>&copy; 2024 My Bakery</p>
60 </footer>
61 </body>
62 </html>
```



## Step 5: Configuring the Web Server:

Now that my webpage was ready, I needed to tell the web server where to find it. I configured the web server to serve the HTML file I created. This involved setting up the directory where my website files are stored, so the web server knows where to look for them. It's like organizing my bakery's kitchen so everything is easy to find and ready to serve up to customers.





## Step 6: Testing my Website:

Finally, with everything set up, it was time to make sure my website was working correctly. I opened a web browser and entered the public IP address of my virtual machine. It's like opening the doors to my bakery and inviting people in to see what I have to offer. If everything is set up correctly, visitors should be able to see my bakery website and all its delicious offerings when they visit the URL.



Microsoft Azure

Search resources, services, and docs (G+J)

1212036@student.birzei...  
DEFAULT DIRECTORY

Home > MajdVM2024

MajdVM2024 | Network settings

Search

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Connect

Connect

Bastion

Windows Admin Center

Networking

Network settings

Load balancing

Application security groups

Network manager

Settings

Disks

Extensions + applications

This is a new experience. [Please provide feedback](#)

Rules Collapse all

Network security group MajdVM2024-nsg (attached to networkInterface: majdvm2024774)

Impacts 0 subnets, 1 network interfaces

Create port rule

Search rules

Source == all

Destination == all

Protocol == all

Action == all

Priority ↑	Name	Port	Protocol	Source	Destination	Action
Inbound port rules (5)						
300	RDP	3389	TCP	Any	Any	Allow
310	AllowAnyCustom8080Inbound	8080	Any	Any	Any	Allow
65000	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny
Outbound port rules (3)						

Type here to search

59°F Mostly sunny

631  
19/04/2024