

Swinburne University of Technology

*COS20019 Cloud Computing Architecture*

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## Assignment 1b

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*Saturday 14th October, 2023*

*Phan Vu*

*Student ID: 104222099*



Infrastructure Requirements

URL: <http://ec2-52-4-156-92.compute-1.amazonaws.com/COS20019/photoalbum/album.php>

Marking scheme: VPC with 2 public and 2 private subnets

Step	Description	Screenshot
1	Create a VPC named <b>PVuVPC</b> in the <b>us-east-1</b> region with <b>10.0.0.0/16</b> IPv4 CIDR block.	<div><div>VPC settings</div><div><div>Resources to create <a href="#">Info</a></div><div>Create only the VPC resource or the VPC and other networking resources.</div><div><div><input type="radio"/> VPC only</div><div><input checked="" type="radio"/> VPC and more</div></div></div><div><div>Name tag auto-generation <a href="#">Info</a></div><div>Enter a value for the Name tag. This value will be used to auto-generate Name tags for all resources in the VPC.</div><div><input checked="" type="checkbox"/> Auto-generate</div><div><div>PVuVPC</div></div></div><div><div>IPv4 CIDR block <a href="#">Info</a></div><div>Determine the starting IP and the size of your VPC using CIDR notation.</div><div><div>10.0.0.0/16</div><div>65,536 IPs</div></div><div>CIDR block size must be between /16 and /28.</div></div><div><div>IPv6 CIDR block <a href="#">Info</a></div><div><input checked="" type="radio"/> No IPv6 CIDR block</div><div><input type="radio"/> Amazon-provided IPv6 CIDR block</div></div><div><div>Tenancy <a href="#">Info</a></div><div><div>Default</div></div></div></div>
2	<b>Number of AZs</b> set to 2 with <b>us-east-1a</b> as first AZ and <b>us-east-1b</b> as AZ B.	<div><div>Number of Availability Zones (AZs) <a href="#">Info</a></div><div>Choose the number of AZs in which to provision subnets. We recommend at least two AZs for high availability.</div><div><div>1</div><div>2</div><div>3</div></div><div><div>▼ Customize AZs</div></div><div><div>First availability zone</div><div><div>us-east-1a</div></div></div><div><div>Second availability zone</div><div><div>us-east-1b</div></div></div></div>
3	Both the number of public subnets and private subnets are set to <b>2</b> .  Public subnet CIDR block is set with the following configuration that aligns with the VPC architecture diagram provided inthe assignment description.	<div><div>Number of public subnets <a href="#">Info</a></div><div>The number of public subnets to add to your VPC. Use public subnets for web applications that need to be publicly accessible over the internet.</div><div><div>0</div><div>2</div></div><div><div>Number of private subnets <a href="#">Info</a></div><div>The number of private subnets to add to your VPC. Use private subnets to secure backend resources that don't need public access.</div><div><div>0</div><div>2</div><div>4</div></div><div><div>▼ Customize subnets CIDR blocks</div></div><div><div>Public subnet CIDR block in us-east-1a</div><div><div>10.0.1.0/24</div><div>256 IPs</div></div></div><div><div>Public subnet CIDR block in us-east-1b</div><div><div>10.0.2.0/24</div><div>256 IPs</div></div></div><div><div>Private subnet CIDR block in us-east-1a</div><div><div>10.0.3.0/24</div><div>256 IPs</div></div></div><div><div>Private subnet CIDR block in us-east-1b</div><div><div>10.0.4.0/24</div><div>256 IPs</div></div></div></div></div>

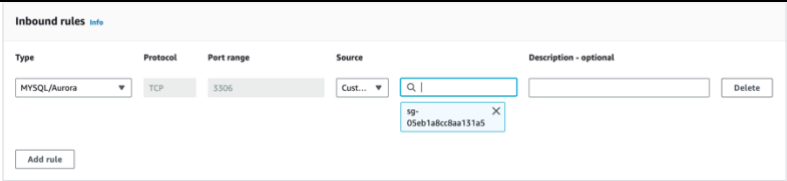
## Marking scheme: Correct Public and Private Routing tables with correct subnet associations

Step	Description	Screenshot
1	Correct subnet association.	<div><div>Number of public subnets <a href="#">Info</a></div><div>The number of public subnets to add to your VPC. Use public subnets for web applications that need to be publicly accessible over the internet.</div><div><div>0</div><div>2</div></div><div>Number of private subnets <a href="#">Info</a></div><div>The number of private subnets to add to your VPC. Use private subnets to secure backend resources that don't need public access.</div><div><div>0</div><div>2</div><div>4</div></div><div>▼ Customize subnets CIDR blocks</div><div>Public subnet CIDR block in us-east-1a</div><div><div>10.0.1.0/24</div><div>256 IPs</div></div><div>Public subnet CIDR block in us-east-1b</div><div><div>10.0.2.0/24</div><div>256 IPs</div></div><div>Private subnet CIDR block in us-east-1a</div><div><div>10.0.3.0/24</div><div>256 IPs</div></div><div>Private subnet CIDR block in us-east-1b</div><div><div>10.0.4.0/24</div><div>256 IPs</div></div></div>
2	Correct routing table.	<div><div>Resource map <a href="#">Info</a></div><div><div><div>Subnets (4)</div><div>Subnets within this VPC</div><div><div>us-east-1a</div><div>PVuVPC-subnet-public1-us-east-1a</div><div>PVuVPC-subnet-private1-us-east-1a</div><div>us-east-1b</div><div>PVuVPC-subnet-public2-us-east-1b</div><div>PVuVPC-subnet-private2-us-east-1b</div></div></div><div><div>Route tables (4)</div><div>Route network traffic to resources</div><div><div>PVuVPC-rtb-private2-us-east-1b</div><div>rtb-09a4a0ec28ea5819e</div><div>PVuVPC-rtb-private1-us-east-1a</div><div>PVuVPC-rtb-public</div></div></div><div><div>Network connections (2)</div><div>Connections to other networks</div><div><div>PVuVPC-igw</div><div>PVuVPC-vpc-s3</div><div>Gateway endpoint to S3</div></div></div></div></div>

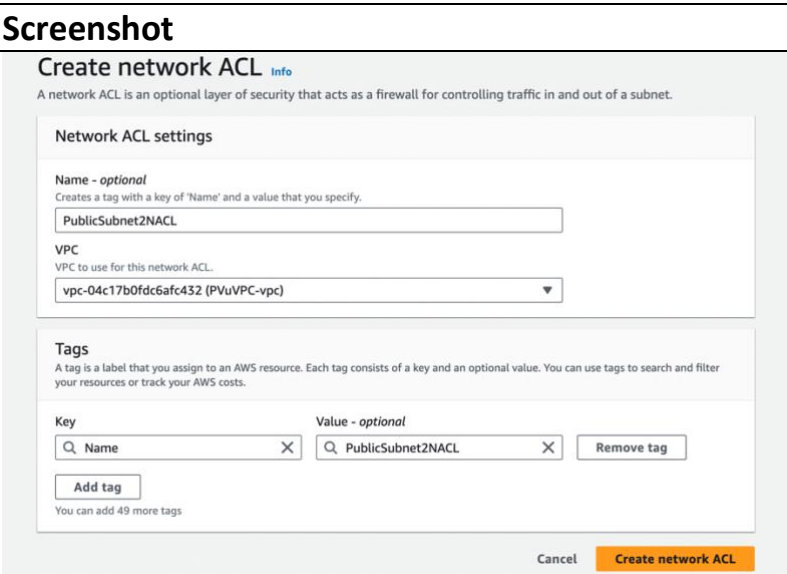
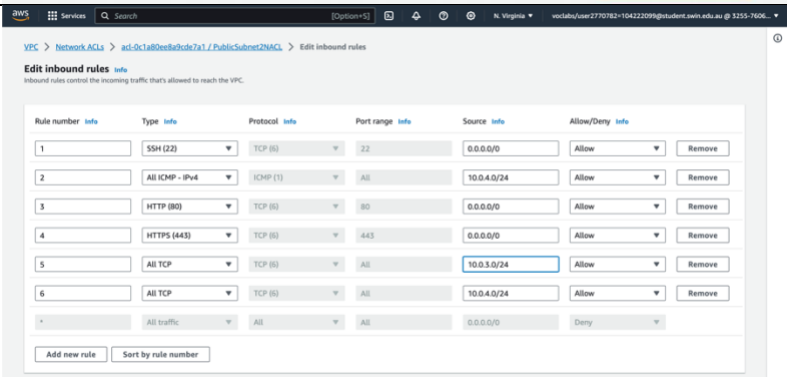
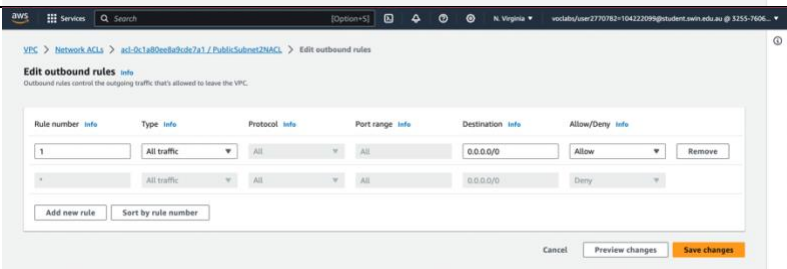
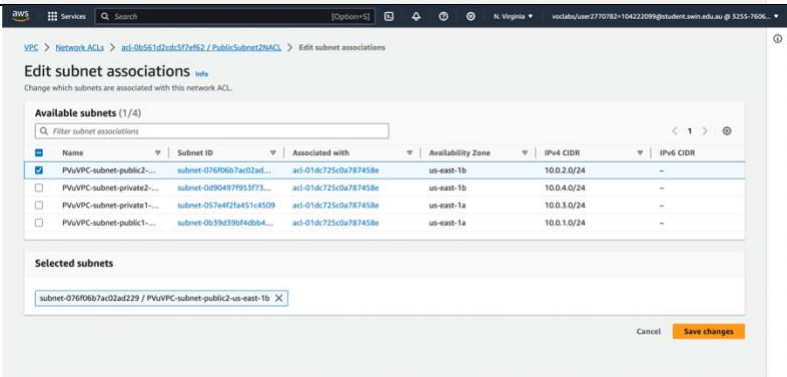
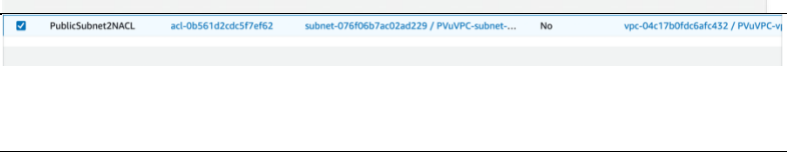
## Marking scheme: Security groups properly configured and attached

Step	Description	Screenshot
1	Create a new security group named <b>TestInstanceSG</b> .	<div><div>Basic details</div><div><div>Security group name <a href="#">Info</a></div><div>TestInstanceSG</div><div>Name cannot be edited after creation.</div><div>Description <a href="#">Info</a></div><div>Test Instance Security Group</div><div>VPC <a href="#">Info</a></div><div><div>Q</div><div>vpc-0fb31dda1c5020f6f (PVuVPC-vpc)</div><div>10.0.0.0/16</div><div>vpc-02d8536d1a2abc350</div><div>172.31.0.0/16</div><div>vpc-0fb31dda1c5020f6f (P</div><div>Security</div></div></div></div>

2	Inbound rule with type <b>All traffic</b> from <b>Anywhere</b> .	<div><div><div><div><div></div><div>Inbound rules Info</div></div><div><div><div><div>Inbound rule 1</div><div>Delete</div></div><div><div>Type InfoAll traffic▼Protocol InfoAll</div><div>Port range InfoAllSource type InfoAnywhere-IPv4▼</div><div>Source Info0.0.0.0/0 XDescription - optional Info</div><div>Add rule</div></div></div></div></div></div></div>
3	Create a new security group named <b>WebServerSG</b> .	<div><div><div><div><div></div><div>Basic details</div></div><div><div>Security group name InfoWebServerSGName cannot be edited after creation.</div><div>Description InfoWeb Server Security Group</div><div>VPC Info<div>vpc-0fb31dda1c5020f6f (PVuVPC-vpc)10.0.0.0/16vpc-02d8536d1a2abc350172.31.0.0/16vpc-0fb31dda1c5020f6f (PVuVPC-vpc)</div></div></div></div></div></div>
4	Inbound rule with type <b>SSH (22)</b> and <b>HTTP (80)</b> from <b>Anywhere</b> and <b>All ICMP - IPv4</b> from security group <b>TestInstanceSG</b> .	<div><div><div><div><div></div><div>Inbound rule 1</div><div>Delete</div></div><div><div>Type InfoSSH▼Protocol InfoTCPPort range Info22</div><div>Source type InfoAnywhere-IPv4▼Source Info0.0.0.0/0 XDescription - optional Info</div></div></div><div><div><div><div><div></div><div>Inbound rule 2</div><div>Delete</div></div><div><div>Type InfoHTTP▼Protocol InfoTCPPort range Info80</div><div>Source type InfoAnywhere-IPv4▼Source Info0.0.0.0/0 XDescription - optional Info</div></div></div><div><div><div><div><div></div><div>Inbound rule 3</div><div>Delete</div></div><div><div>Type InfoAll ICMP - IPv4▼Protocol InfoICMPPort range InfoAll</div><div>Source type InfoCustom▼Source Infosg-09267ebcdcaf9a19 XDescription - optional Info</div></div></div></div></div></div></div></div></div>
5	Create a new security group named <b>DBServerSG</b> .	<div><div><div><div><div></div><div>Basic details</div></div><div><div>Security group name InfoDBServerSGName cannot be edited after creation.</div><div>Description InfoDatabase Server Security Group</div><div>VPC Info<div>vpc-0fb31dda1c5020f6f (PVuVPC-vpc)10.0.0.0/16vpc-02d8536d1a2abc350172.31.0.0/16vpc-0fb31dda1c5020f6f (PVuVPC-vpc)</div></div></div></div></div></div>

6	Inbound rule with <b>type MySQL (3306)</b> from security group <b>WebServerSG</b> .	
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# Marking scheme: Network ACL properly configured and attached

Step	Description	Screenshot
1	Create a new network ACL named <b>PublicSubnet2NACL</b> .	
2	Configuration of the inbound rules.	
3	Outbound rule set to <b>All traffic</b> .	
4	Associate the NACL to Public Subnet 2 (CIDR 10.0.2.0/24 and us-east-1b AZ).	
5	NACL successfully associated with the Public Subnet 2 (CIDR 10.0.2.0/24 and us-east-1b AZ).	

# Marking scheme: Correct Web server and Test instances running in correct subnets





Step	Description	Screenshot
1	Create a web server instance named <b>Bastion Instance</b> .	<div><div>Launch an instance <a href="#">Info</a></div><div>Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.</div><div><div><div>Name and tags <a href="#">Info</a></div><div><div>Name</div><div>Bastion Instance</div><div>Add additional tags</div></div></div></div></div>
2	Use <b>Amazon Linux 2 AMI (HVM), SSD Volume Type</b> for OS image.	<div><div><div>▼ Application and OS Images (Amazon Machine Image) <a href="#">Info</a></div><div>An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below</div><div><div><div>Q Search our full catalog including 1000s of application and OS images</div></div><div><div>Recents</div><div>Quick Start</div></div><div><div><div><div>Amazon Linux</div><div>aws</div></div><div><div>macOS</div><div>Mac</div></div><div><div>Ubuntu</div><div>ubuntu</div></div><div><div>Windows</div><div>Microsoft</div></div></div><div><div>Browse more AMIs</div><div>Including AMIs from AWS, Marketplace and the Community</div></div></div><div><div>Amazon Machine Image (AMI)</div><div><div>Amazon Linux 2 AMI (HVM) - Kernel 5.10, SSD Volume Type</div><div>Free tier eligible</div></div><div>ami-0bb4c991fa89d4b9b (64-bit (x86)) / ami-0a445ece583184891 (64-bit (Arm))</div><div>Virtualization: hvm    ENA enabled: true    Root device type: ebs</div></div><div><div>Description</div><div>Amazon Linux 2 Kernel 5.10 AMI 2.0.20230926.0 x86_64 HVM gp2</div></div><div><div>Architecture</div><div>AMI ID</div></div><div><div>64-bit (x86)</div><div>ami-0bb4c991fa89d4b9b</div><div>Verified provider</div></div></div></div></div>
3	Choose <b>t2.micro</b> for Instance type.	<div><div><div>▼ Instance type <a href="#">Info</a></div><div><div><div>Instance type</div><div><div>t2.micro</div><div>Free tier eligible</div></div><div>Family: t2   1 vCPU   1 GiB Memory   Current generation: true</div><div>On-Demand Windows base pricing: 0.0162 USD per Hour</div><div>On-Demand SUSE base pricing: 0.0116 USD per Hour</div><div>On-Demand RHEL base pricing: 0.0716 USD per Hour</div><div>On-Demand Linux base pricing: 0.0116 USD per Hour</div></div><div><div>All generations</div><div>Compare instance types</div></div></div><div><div>Additional costs apply for AMIs with pre-installed software</div></div></div><div><div>▼ Key pair (login) <a href="#">Info</a></div><div><div>You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.</div><div><div>Key pair name - required</div><div>Vu</div><div>Create new key pair</div></div></div></div></div>



4	<p>Choose <b>PVuVPC</b> as the VPC for the instance.</p> <p>Choose <b>PVuVPC-subnet-public2-us-east-1b (CIDR 10.0.2.0/24)</b> as subnet association.</p> <p>Use <b>WebServerSG</b> security group.</p>	<div><div><div><div><div>▼ Network settings Info</div></div><div><div>VPC - required Info</div><div>vpc-0fb31dda1c5020f6f (PVuVPC-vpc) 10.0.0.0/16</div></div><div><div>Subnet Info</div><div>subnet-08db1bf16500c1eff PVuVPC-subnet-public2-us-east-1b VPC: vpc-0fb31dda1c5020f6f    Owner: 325576069040 Availability Zone: us-east-1b    IP addresses available: 251 CIDR: 10.0.2.0/24</div></div><div><div>Auto-assign public IP Info</div><div>Disable</div></div><div><div>Firewall (security groups) Info</div><div>A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.</div><div><div>Create security group</div><div>Select existing security group</div></div><div><div>Common security groups Info</div><div>Select security groups</div><div>WebServerSG sg-05eb1a8cc8aa131a5 X VPC: vpc-0fb31dda1c5020f6f</div><div>Compare security group rules</div></div><div>Security groups that you add or remove here will be added to or removed from all your network interfaces.</div><div>▶ Advanced network configuration</div></div></div></div></div>
5	<p>Bash script to install Apache web server and other PHP packages to the <b>Bastion Instance</b>.</p>	<div><div><div>User data - optional Info</div><div>Upload a file with your user data or enter it in the field.</div><div>Choose file</div></div><div><pre>#!/bin/bash yum update -y amazon-linux-extras install -y lamp-mariadb10.2-php7.2 php7.2 yum install -y httpd mariadb-server php-mbstring php-xml systemctl start httpd systemctl enable httpd usermod -a -G apache ec2-user chown -R ec2-user:apache /var/www chmod 2775 /var/www find /var/www -type d -exec sudo chmod 2775 {} \; find /var/www -type f -exec sudo chmod 0664 {} \; echo "&lt;?php echo '&lt;h2&gt;Welcome to COS80001. Installed PHP version: ' . phpversion() . '&lt;/h2&gt;'; ?&gt;" &gt; /var/www/html/phpinfo.php</pre></div><div><input type="checkbox"/> User data has already been base64 encoded</div></div>
6	<p>Create a web server instance named <b>Test Instance</b>.</p>	<div><div><div>Name and tags Info</div><div><div>Name</div><div>Test Instance</div></div><div>Add additional tags</div></div></div>
7	<p>Use <b>Amazon Linux 2 AMI (HVM), SSD Volume Type</b> for OS image.</p>	<div><div><div>Recents Quick Start</div><div><div>Amazon Linux aws</div><div>macOS Mac</div><div>Ubuntu ubuntu</div><div>Windows Microsoft</div></div><div>Browse more AMIs Including AMIs from AWS, Marketplace and the Community</div></div><div><div>Amazon Machine Image (AMI)</div><div>Amazon Linux 2 AMI (HVM) - Kernel 5.10, SSD Volume Type Free tier eligible ami-0bb4c991fa89d4b9b (64-bit (x86)) / ami-0a445ece583184891 (64-bit (Arm)) Virtualization: hvm    ENA enabled: true    Root device type: ebs</div></div><div><div>Description</div><div>Amazon Linux 2 Kernel 5.10 AMI 2.0.20230926.0 x86_64 HVM gp2</div></div><div><div>Architecture</div><div>AMI ID</div><div>64-bit (x86)</div><div>ami-0bb4c991fa89d4b9b</div><div>Verified provider</div></div></div>

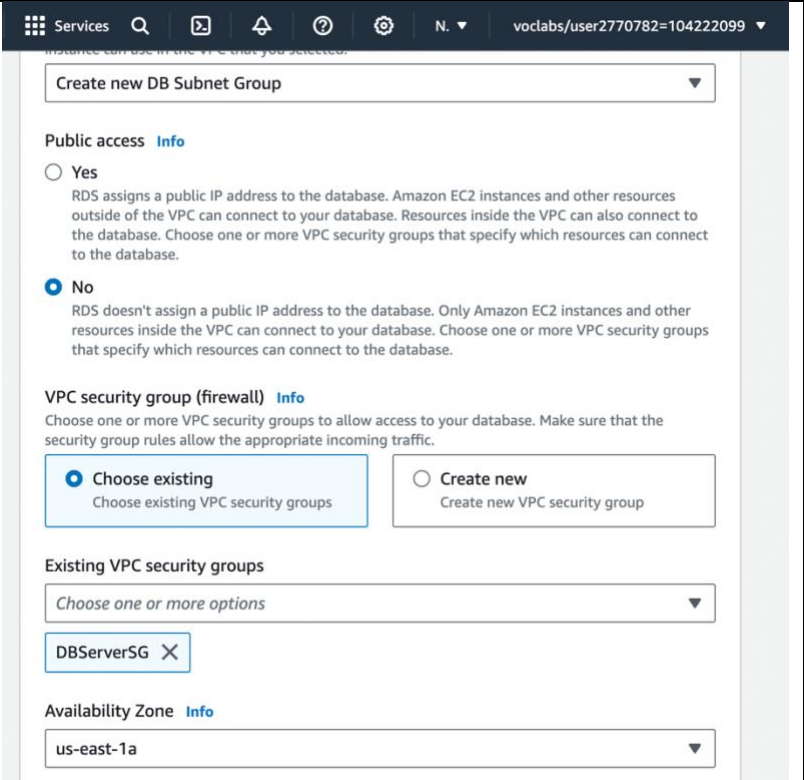
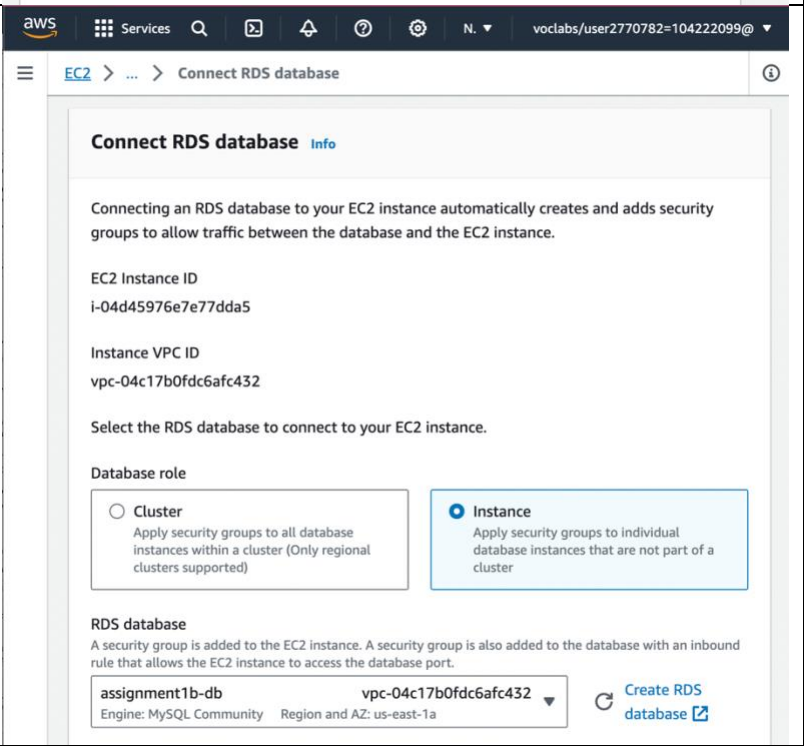
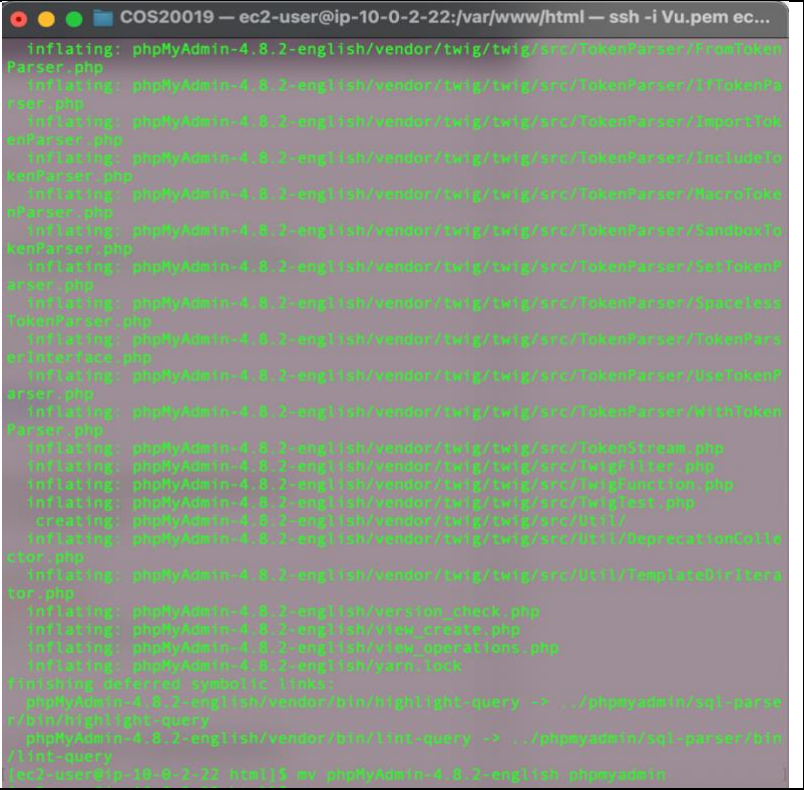
8	Choose <b>t2.micro</b> for <b>Instance type</b> .	<div><div><div>▼ Instance type Info</div><div><div>Instance type</div><div><div>t2.micro</div><div>Free tier eligible</div><div>Family: t2 1 vCPU 1 GiB Memory Current generation: true</div><div>On-Demand Windows base pricing: 0.0162 USD per Hour</div><div>On-Demand SUSE base pricing: 0.0116 USD per Hour</div><div>On-Demand RHEL base pricing: 0.0716 USD per Hour</div><div>On-Demand Linux base pricing: 0.0116 USD per Hour</div></div></div><div><div><input checked="" type="radio"/> All generations</div><div><a href="#">Compare instance types</a></div></div></div></div>
9	<div>Choose <b>PVuVPC</b> as the VPC for the instance.</div> <div>Choose <b>PVuVPC-subnet-private2-us-east-1b (CIDR 10.0.4.0/24)</b> as subnet association.</div> <div>Use <b>TestInstanceSG</b> security group.</div>	<div><div><div>▼ Network settings Info</div><div><div>VPC - required Info</div><div><div>vpc-0fb31dda1c5020f6f (PVuVPC-vpc)</div><div>10.0.0.0/16</div></div><div><div>Subnet Info</div><div><div>subnet-06a2c0b443236c8a1</div><div>PVuVPC-subnet-private2-us-east-1b</div><div>VPC: vpc-0fb31dda1c5020f6f Owner: 325576069040</div><div>Availability Zone: us-east-1b IP addresses available: 251</div><div>CIDR: 10.0.4.0/24</div></div><div><div><input checked="" type="radio"/> Create new subnet</div><div><a href="#">Create new subnet</a></div></div></div><div><div>Auto-assign public IP Info</div><div><div>Disable</div></div></div><div><div>Firewall (security groups) Info</div><div><div>A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.</div><div><div><input type="radio"/> Create security group</div><div><input checked="" type="radio"/> Select existing security group</div></div><div><div>Common security groups Info</div><div><div>Select security groups</div><div>TestInstanceSG sg-09267ebcdcac9a19 X</div><div>VPC: vpc-0fb31dda1c5020f6f</div></div><div><div><input checked="" type="radio"/> Compare security group rules</div><div><a href="#">Compare security group rules</a></div></div></div><div><div>Security groups that you add or remove here will be added to or removed from all your network interfaces.</div></div></div></div></div></div></div>

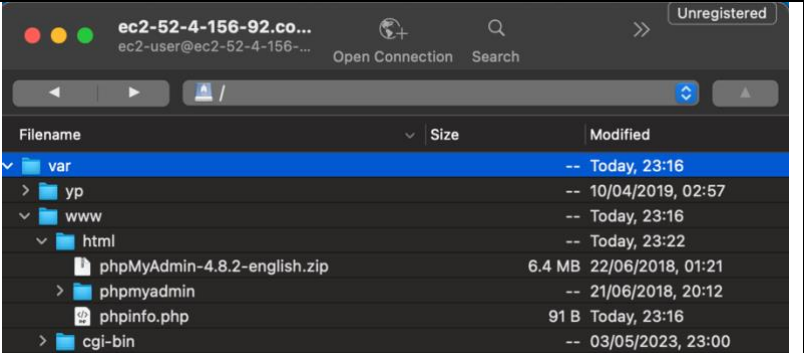
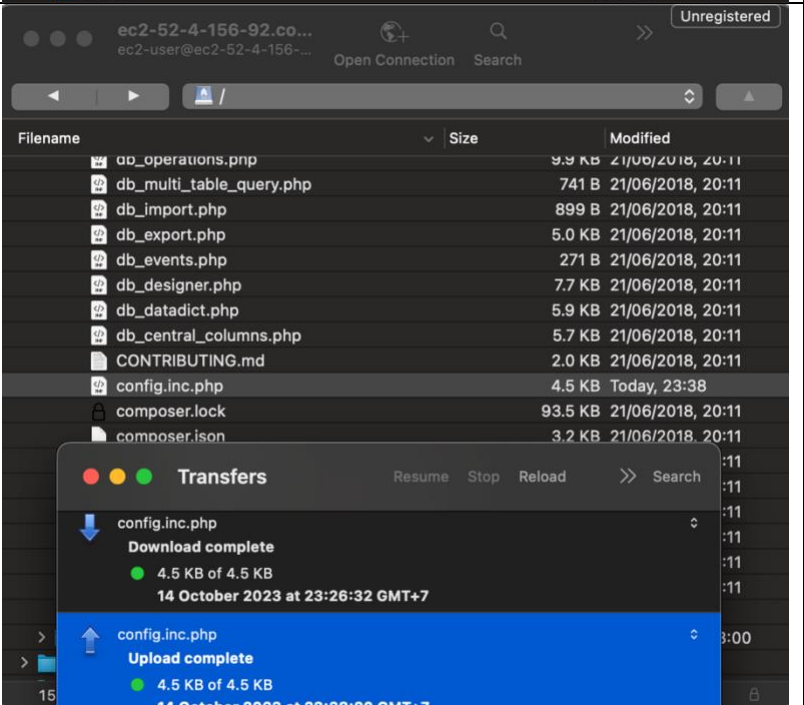
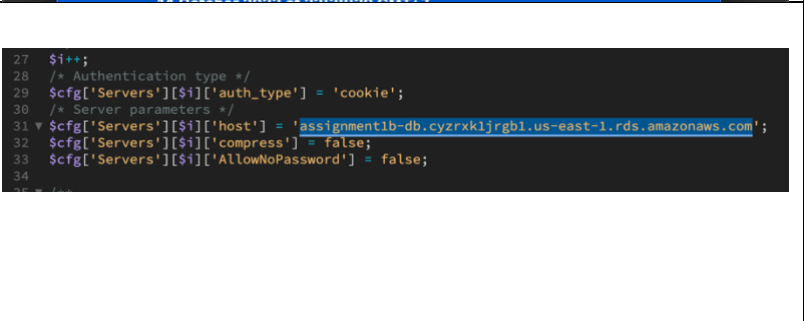

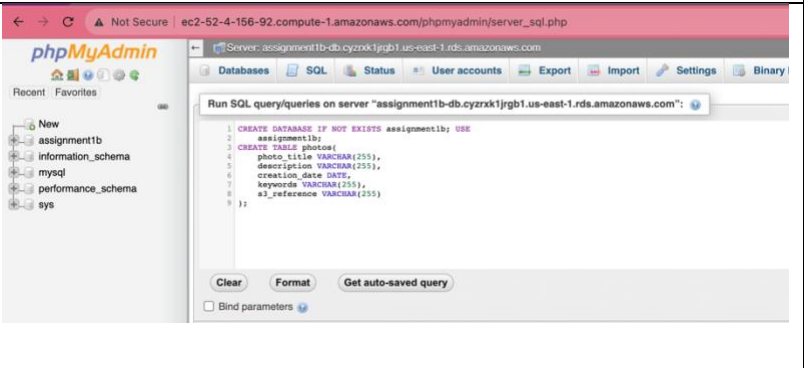
Marking scheme: Database schema as specified

Step	Description	Screenshot
1	Create new RDS with the engine type option of <b>MySQL</b> .	<div><div><div><div><input checked="" type="radio"/> Standard create</div><div>You set all of the configuration options, including ones for availability, security, backups, and maintenance.</div></div><div><div><input type="radio"/> Easy create</div><div>Use recommended best-practice configurations. Some configuration options can be changed after the database is created.</div></div></div><div><div>Engine options</div><div><div>Engine type Info</div><div><div><div><input type="radio"/> Aurora (MySQL Compatible)</div><div></div></div><div><div><input checked="" type="radio"/> MySQL</div><div></div></div></div><div><div><div><input type="radio"/> Aurora (PostgreSQL Compatible)</div><div></div></div><div><div><input type="radio"/> MariaDB</div><div></div></div></div></div></div></div>



2	<p>Choose <b>MySQL 8.0.34</b> as DB engine version.</p> <p>Use the <b>Free tier</b> template for the RDS.</p>	<div><div>Services</div><div>Engine Version</div><div>MySQL 8.0.34</div><div>Templates</div><div>Choose a sample template to meet your use case.</div><div><div><div>Production</div><div>Use defaults for high availability and fast, consistent performance.</div></div><div><div>Dev/Test</div><div>This instance is intended for development use outside of a production environment.</div></div><div><div>Free tier</div><div>Use RDS Free Tier to develop new applications, test existing applications, or gain hands-on experience with Amazon RDS. Info</div></div></div></div>
3	<p>Assign the DB instance identifier with the name <b>assignment1b-db</b>.</p> <p>Modify credentials settings for master account.</p>	<div><div>Services</div><div>Settings</div><div>DB instance identifier Info</div><div>Type a name for your DB instance. The name must be unique across all DB instances owned by your AWS account in the current AWS Region.</div><div>assignment1b-db</div><div>The DB instance identifier is case-insensitive, but is stored as all lowercase (as in "mydbinstance"). Constraints: 1 to 60 alphanumeric characters or hyphens. First character must be a letter. Can't contain two consecutive hyphens. Can't end with a hyphen.</div><div>Credentials Settings</div><div>Master username Info</div><div>Type a login ID for the master user of your DB instance.</div><div>admin</div><div>1 to 16 alphanumeric characters. The first character must be a letter.</div><div><div>Manage master credentials in AWS Secrets Manager</div><div>Manage master user credentials in Secrets Manager. RDS can generate a password for you and manage it throughout its lifecycle.</div></div><div><div>If you manage the master user credentials in Secrets Manager, some RDS features aren't supported. Learn more</div></div><div><div>Auto generate a password</div><div>Amazon RDS can generate a password for you, or you can specify your own password.</div></div><div>Master password Info</div><div>Constraints: At least 8 printable ASCII characters. Can't contain any of the following: / (slash), ' (single quote), " (double quote) and @ (at sign).</div><div>Confirm master password Info</div></div>
4	<p>In this case, opt to not connect to an EC2 immediately.</p> <p>Choose <b>PVuVPC</b> for the DB instance.</p>	<div><div>Connectivity Info</div><div>Compute resource</div><div>Choose whether to set up a connection to a compute resource for this database. Setting up a connection will automatically change connectivity settings so that the compute resource can connect to this database.</div><div><div>Don't connect to an EC2 compute resource</div><div>Don't set up a connection to a compute resource for this database. You can manually set up a connection to a compute resource later.</div></div><div><div>Connect to an EC2 compute resource</div><div>Set up a connection to an EC2 compute resource for this database.</div></div><div>Network type Info</div><div>To use dual-stack mode, make sure that you associate an IPv6 CIDR block with a subnet in the VPC you specify.</div><div><div>IPv4</div><div>Your resources can communicate only over the IPv4 addressing protocol.</div></div><div><div>Dual-stack mode</div><div>Your resources can communicate over IPv4, IPv6, or both.</div></div><div>Virtual private cloud (VPC) Info</div><div>Choose the VPC. The VPC defines the virtual networking environment for this DB instance.</div><div>PVuVPC-vpc (vpc-04c17b0fdc6afc432)</div><div>4 Subnets, 2 Availability Zones</div><div>Only VPCs with a corresponding DB subnet group are listed.</div></div>

5	<p><b>Public access set to No.</b></p> <p>Use <b>DBServerSG</b> for <b>VPC security group</b>.</p> <p>AZ set to <b>us-east-1a</b> (AZ 1 according to the provided diagram).</p>	
6	<p><b>Connect EC2 Bastion Instance to the created RDS instance.</b></p>	
7	<p><b>Installing PHP to the EC2 instance.</b></p>	

8	phpMyAdmin successfully installed in the <b>Bastion Instance</b> .	
9	Rename <b>config.sample.inc.php</b> to <b>config.inc.php</b> .	
10	Replace 'localhost' in \$cfg['Servers'][\$i]['host'] = 'localhost'; with: 'assignment1b-db.cyzrxk1jrgb1.us-east-1.rds.amazonaws.com'	
11	Login to phpMyAdmin using created master credentials in the RDS creation step.	
12	Create the database as well as a new table in phpMyadmin using the following SQL commands.	

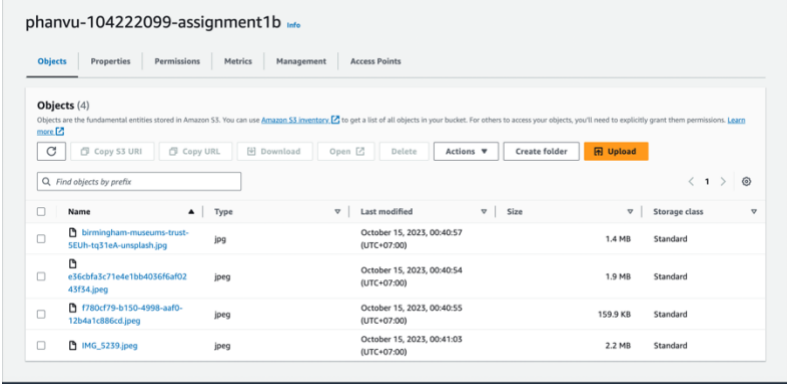
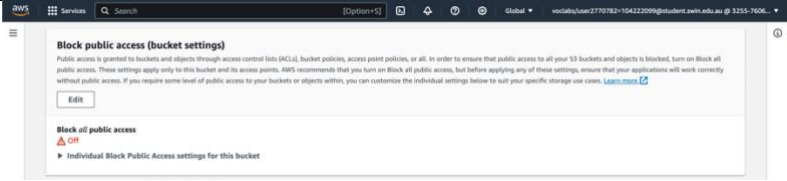
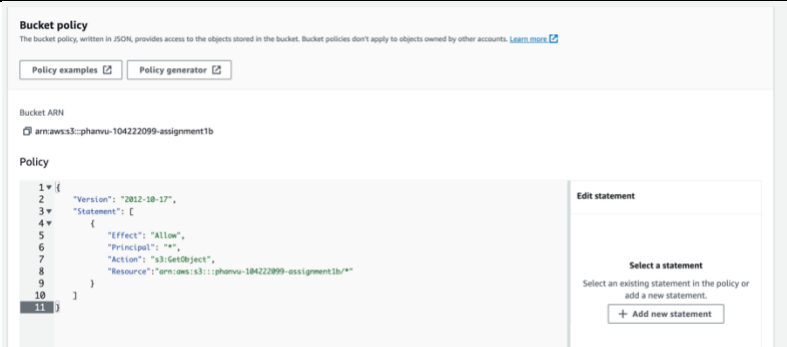


13	Database and table successfully created.	<div><div>✓ MySQL returned an empty result set (i.e. zero rows). (Query took 0.0031 seconds.)</div><div>CREATE DATABASE IF NOT EXISTS assignment1b</div><div>[Edit inline] [Edit] [Create PHP code]</div><div>Note: #1007 Can't create database 'assignment1b': database exists</div><div>✓ MySQL returned an empty result set (i.e. zero rows). (Query took 0.0005 seconds.)</div><div>USE assignment1b</div><div>[Edit inline] [Edit] [Create PHP code]</div><div>✓ MySQL returned an empty result set (i.e. zero rows). (Query took 0.0298 seconds.)</div><div>CREATE TABLE photoa( photo_title VARCHAR(255), description VARCHAR(255), creation_date DATE, keywords VARCHAR(255), a3_reference VARCHAR(255) )</div><div>[Edit inline] [Edit] [Create PHP code]</div></div>
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## Marking scheme: Database running in correct subnets

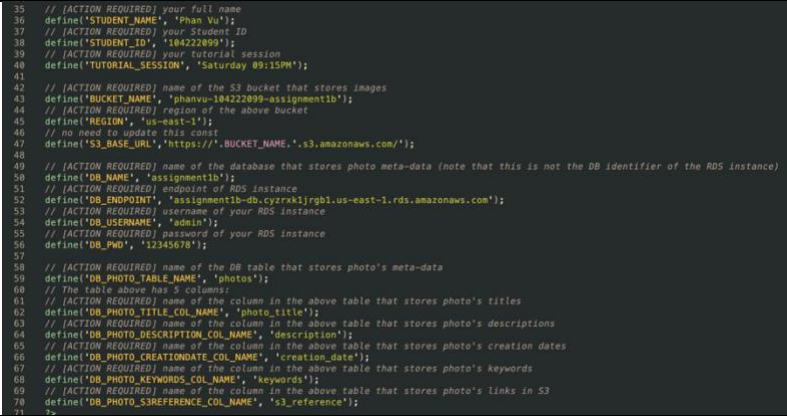
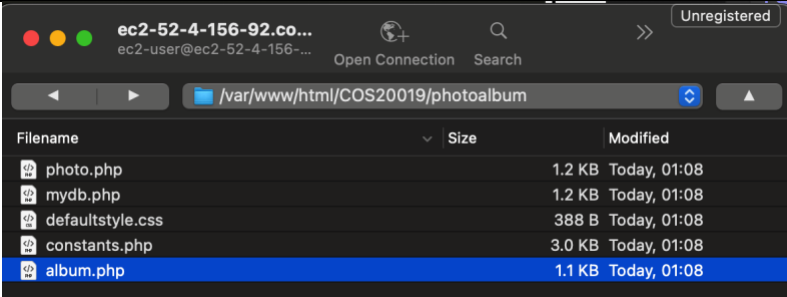
Step	Description	Screenshot									
1	<p>Create a new subnet group named <b>DBSubnetGroup</b> in <b>PVuVPC</b>.</p> <p>Configuration:</p> <ul style="list-style-type: none"><li>- <b>AZ</b>: Choose <b>us-east-1a</b> and <b>us-east-1b</b>.</li><li>- Subnets: Choose private subnets (CIDR 10.0.3.0/24 and 10.0.4.0/24).</li></ul>	<div><div><div><div><div>aws</div><div>Services</div><div>Q</div><div></div><div></div><div></div><div></div><div>N. Vi</div><div>voclabs/user2770782=104222099@student.swin.</div></div><div></div><div><div>RDS &gt; Subnet groups &gt; Create DB subnet group</div><div>Create DB subnet group</div><div>To create a new subnet group, give it a name and a description, and choose an existing VPC. You will then be able to add subnets related to that VPC.</div><div><div><div>Subnet group details</div><div><div>Name</div><div>You won't be able to modify the name after your subnet group has been created.</div><div>DBSubnetGroup</div><div>Must contain from 1 to 255 characters. Alphanumeric characters, spaces, hyphens, underscores, and periods are allowed.</div></div><div><div>Description</div><div>Private Subnet Group</div></div><div><div>VPC</div><div>Choose a VPC identifier that corresponds to the subnets you want to use for your DB subnet group. You won't be able to choose a different VPC identifier after your subnet group has been created.</div><div>PVuVPC-vpc (vpc-04c17b0fdc6afc432)</div></div></div></div><div><div>Add subnets</div><div><div>Availability Zones</div><div>Choose the Availability Zones that include the subnets you want to add.</div><div>Choose an availability zone</div><div>us-east-1a X us-east-1b X</div></div><div><div>Subnets</div><div>Choose the subnets that you want to add. The list includes the subnets in the selected Availability Zones.</div><div>Select subnets</div><div>subnet-057e4f2fa451c4509 (10.0.3.0/24) X subnet-0d90497f953f73953 (10.0.4.0/24) X</div><div>For Multi-AZ DB clusters, you must select 3 subnets in 3 different Availability Zones.</div></div><div><div>Subnets selected (2)</div><table><tr><th>Availability zone</th><th>Subnet ID</th><th>CIDR block</th></tr><tr><td>us-east-1a</td><td>subnet-057e4f2fa451c4509</td><td>10.0.3.0/24</td></tr><tr><td>us-east-1b</td><td>subnet-0d90497f953f73953</td><td>10.0.4.0/24</td></tr></table></div></div></div></div></div></div>	Availability zone	Subnet ID	CIDR block	us-east-1a	subnet-057e4f2fa451c4509	10.0.3.0/24	us-east-1b	subnet-0d90497f953f73953	10.0.4.0/24
Availability zone	Subnet ID	CIDR block									
us-east-1a	subnet-057e4f2fa451c4509	10.0.3.0/24									
us-east-1b	subnet-0d90497f953f73953	10.0.4.0/24									
2	<p>Connect the RDS instance with the created subnet group.</p>	<div><div><div>Connectivity</div><div></div></div><div><div>Network type Info</div><div>To use dual-stack mode, make sure that you associate an IPv6 CIDR block with a subnet in the VPC you specify.</div><div><div><div>IPv4</div><div>Your resources can communicate only over the IPv4 addressing protocol.</div></div><div><div>Dual-stack mode</div><div>Your resources can communicate over IPv4, IPv6, or both.</div></div></div><div><div>DB subnet group</div><div>dbsubnetgroup</div></div><div><div>Security group</div><div>List of DB security groups to associate with this DB instance.</div><div>Choose security groups</div><div>rds-ec2-1 X DBServerSG X</div></div><div><div>Certificate authority Info</div><div>Using a server certificate provides an extra layer of security by validating that the connection is being made to an Amazon database. It does so by checking the server certificate that is automatically installed on all databases that you provision.</div><div>rds-ca-2019</div><div>Expiry: Aug 23, 2024</div></div></div></div>									

# Marking scheme: S3 objects publicly accessible, using proper access policy

Step	Description	Screenshot
1	Create a new bucket named luutuanhoang-104180391-assignment1b Manually add photos into the bucket.	
2	Block all public access set to Off.	
3	The following policy is used to enable public access to all available objects in this S3 bucket.	

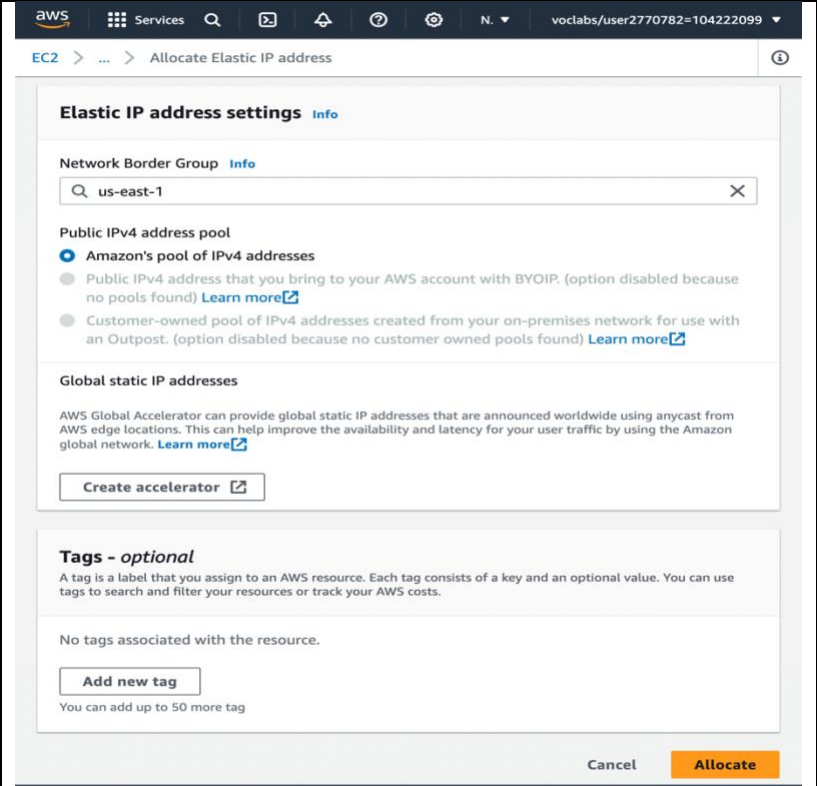
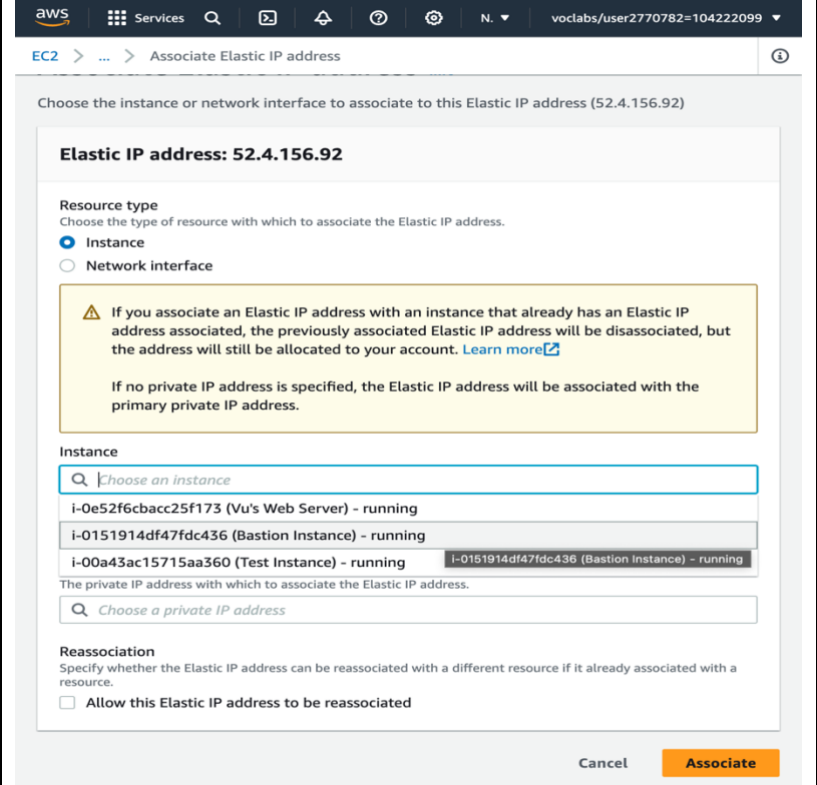
## Functional Requirements

# Marking scheme: album.php page displayed from EC2 Web server

Step	Description	Screenshot
1	Modify constants in constants.php.	
2	Transfer website source code to Bastion Instance.  Directory: var/www/html/ COS20019/photoalbum/	

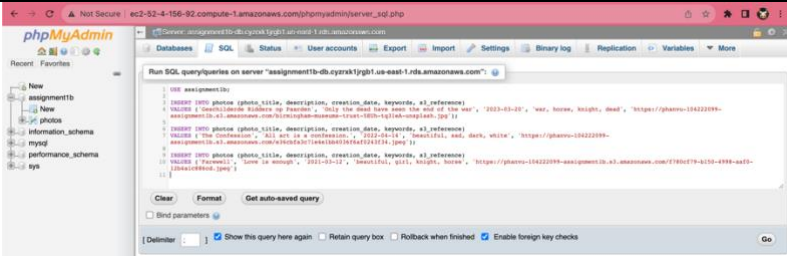

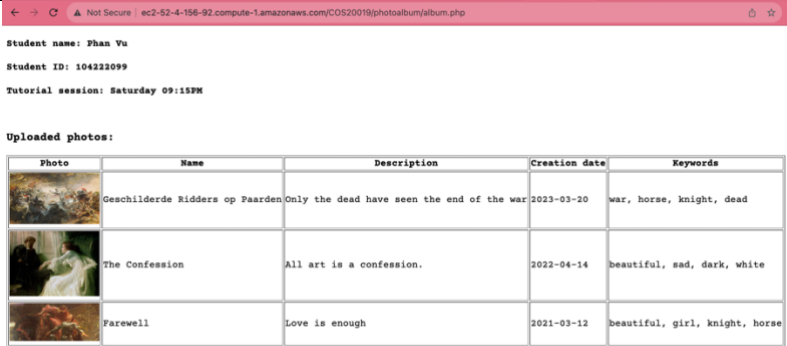
3	<b>album.php</b> page successfully displayed from EC2 Web server ( <b>Bastion Instance</b> ).	
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## Marking scheme: Provided URL is persistent (Elastic IP Association)

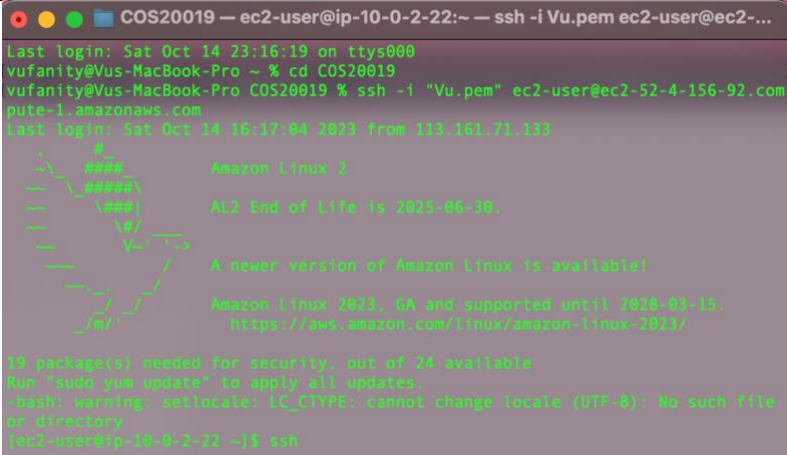
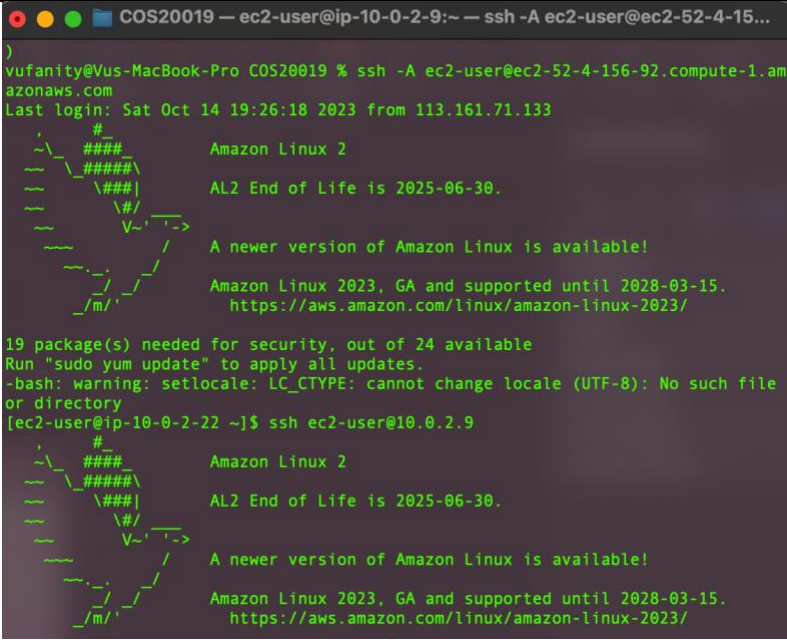
Step	Description	Screenshot
1	Allocate the new Elastic IP address from <b>us-east-1 Network Border Group</b> .	
2	Associated created Elastic IP address to the <b>Bastion Instance</b> .  <b>Bastion Instance</b> associated with the Elastic IP address.  Elastic IP address: <b>52.4.156.92</b>  Website URL: <b>ec2-52-4-156-92.compute1.amazonaws.com/cos20019/photoalbum/album.php</b>	



# Marking scheme: Photos loaded from S3 with matching metadata from RDS

Step	Description	Screenshot
1	Insert metadata into the database using SQL commands.	
2	Data records in the database.	
3	The website is able to list all the photos (stored in the S3 bucket) along with their meta-data (stored in the database).	

# Marking scheme: Web server instance reachable from Test instance via ICMP

Step	Description	Screenshot
1	SSH to Bastion Instance.	
2	SSH from Bastion Instance to Test Instance.	

3	Successfully ping the Bastion Instance from the Test instance.	<pre>[ec2-user@ip-10-0-2-9 ~]\$ ping 10.0.2.22 PING 10.0.2.22 (10.0.2.22) 56(84) bytes of data. 64 bytes from 10.0.2.22: icmp_seq=1 ttl=255 time=0.511 ms 64 bytes from 10.0.2.22: icmp_seq=2 ttl=255 time=0.583 ms 64 bytes from 10.0.2.22: icmp_seq=3 ttl=255 time=0.665 ms 64 bytes from 10.0.2.22: icmp_seq=4 ttl=255 time=0.629 ms 64 bytes from 10.0.2.22: icmp_seq=5 ttl=255 time=0.650 ms 64 bytes from 10.0.2.22: icmp_seq=6 ttl=255 time=0.673 ms 64 bytes from 10.0.2.22: icmp_seq=7 ttl=255 time=0.585 ms 64 bytes from 10.0.2.22: icmp_seq=8 ttl=255 time=0.589 ms 64 bytes from 10.0.2.22: icmp_seq=9 ttl=255 time=0.571 ms 64 bytes from 10.0.2.22: icmp_seq=10 ttl=255 time=0.633 ms 64 bytes from 10.0.2.22: icmp_seq=11 ttl=255 time=0.660 ms 64 bytes from 10.0.2.22: icmp_seq=12 ttl=255 time=0.671 ms 64 bytes from 10.0.2.22: icmp_seq=13 ttl=255 time=0.564 ms 64 bytes from 10.0.2.22: icmp_seq=14 ttl=255 time=0.643 ms</pre>
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P/s: Sorry for all of the inconveniences that I made. Thank you.

**END.**