<center>Project 0: EC2 Project Report</center>

Step 0 + 1: Obtain EC2 Credentials + Install EC2 Tools
One of my first impressions from trying to navigate through AWS to obtain EC2 credentials was
that it was confusing with all the different domains.
Another hiccup when trying to get everything set up was with the ~/.*bashrc* step because my
terminal uses *zsh* so I was not sure if the following *bash* commands of the project were supposed
to be switched to zsh (i.e. bashrc -> zshrc)
I did have trouble with installing the given EC2 tools, so I used the AWS CLI tools. I followed
https://docs.aws.amazon.com/cli/latest/userguide/install-cliv2-mac.html to set up AWS CLI.
I generated an access key via EC2 Console and used the terminal command `aws configure` to
define the access key, secret key, default region name, and default output format.
Because I was not using EC2 tools, the command I used to test the environment was:

```
aws ec2 describe-regions
```
I also generated a key pair using the instructions from this link:
https://docs.aws.amazon.com/cli/latest/userguide/cli-services-ec2-keypairs.html

<div style="border:1px solid #e88; background:#fde9e9; padding:6px;">

Commented [JL(1): The key pair can also be created in CLI
with command:

aws ec2 create-key-pair --key-name MyKeyPair --output text
> MyKeyPair.pem
</div>

Step 2: Create Instance
The command I used to create an instance was:

```
aws ec2 run-instances \
      --image-id ami-22ce4934 \
      --count 1 \
      --instance-type t2.micro \
      --key-name MyKeyPair
```
The time it took to create this instance was between ~20-25 seconds.

The command and its respective output I used to check the instance was:
```
aws ec2 describe-instances
```

```
"Reservations": [
    {
        "Groups": [],
        "Instances": [
            {
                "AmiLaunchIndex": 0,
                "ImageId": "ami-22ce4934",
                "InstanceId": "i-0a3e080bf92960e8a",
                "InstanceType": "t2.micro",
                "KeyName": "MyKeyPair",
                .
                .
                "PublicDnsName": "ec2-3-86-42-226.compute-1.amazonaws.com",
```
Step 3: ssh into instance
The command I used via AWS CLI to ssh into the instance was:
```
ssh -i /Users/brian/MyKeyPair.pem ec2-user@ec2-3-86-42-226.compute-1.amazonaws.com
```

It did time-out but worked after editing inbound rules.
After connecting, the user for the terminal user is now `[ec2-user@ip-172-31-68-255 ~]$`
Instead of default `brian@ ~ %`
I also had to do the command `aws configure` after logging into ssh

Step 4 + 5: Install an application + Create new image from running instance
I had to `sudo` the command given in the instructions for step 4 for it to work.

To create an image, the command I used and output is as follows:
```
aws ec2 create-image --instance-id i-0a3e080bf92960e8a --name mkp_test_image
```

```
{
    "ImageId": "ami-06e2d2740f0fb8a43"
}
```

```
aws ec2 describe-images --image-ids ami-06e2d2740f0fb8a43
```
Time for image status to be available was ~5 minutes.

Step 6: Terminate Instances
```
aws ec2 terminate-instances --instance-id i-0a3e080bf92960e8a
```
Estimated time: ~35-45 seconds

```
aws ec2 run-instances --image-id ami-06e2d2740f0fb8a43 --count 1 --instance-type
t2.micro --key-name MyKeyPair
```
Estimated time: ~30-40 seconds

Step 7: Pricing Estimation
Total Time: 1 hr
Total Storage SSD: 8GB
Total Data In: < 1GB
Total Data Out: <1GB

t2.micro: $0.0116 per Hour
Data transfer from EC2 to us-east-1: $0.01 per GB
Elastic IP & Carrier IP: Free for 1 instance, $.005 per each additional EIP/CIP
$0.05 per vCPU-Hour for Linux, RHEL and SLES
General Purpose SSD (gp3) – Storage $0.08/GB-Month

$$(1\ HR * \$0.0116/HR) + (1\ GB * \$0.01/GB) + (8\ GB * \$0.08/GB) = \$1.6516 \approx \$1.66$$

Step 8: Cleaning Up
```
aws ec2 deregister-image --image-id ami-06e2d2740f0fb8a43
aws ec2 describe-snapshots
aws ec2 delete-snapshot --snapshot-id snap-46b378d0
```