Homework 1: Using S3

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SDEV 400

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Part I

Objective:

Using the AWS Management Console, create two (2) S3 buckets with DNS-compliant names of your choice. In each of the buckets create 2 folders named as follows:

- Jobs
- Support

Documentation:

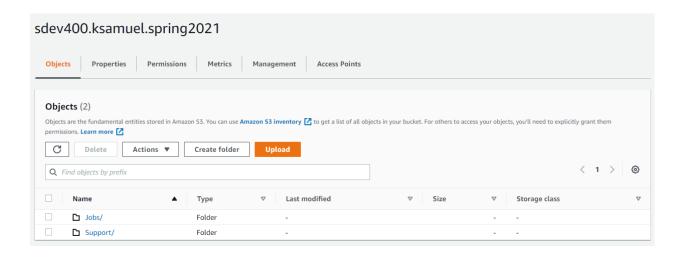


Figure 1.0: AWS Console: First S3 Bucket.

A bucket called "sdev400.ksamuel.spring2021" with two folders, Jobs and Support,
 created in the AWS Management Console.

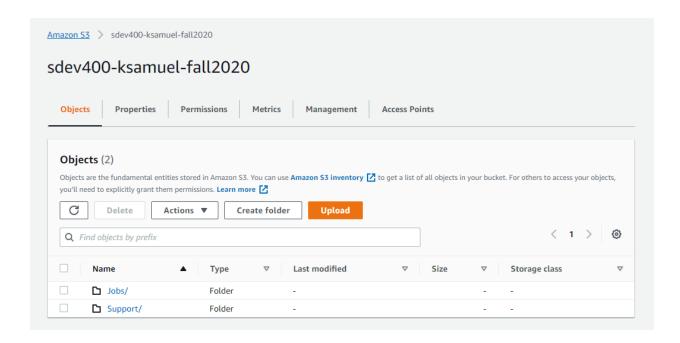


Figure 1.1: AWS Console: Second S3 Bucket.

A bucket called "sdev400.ksamuel.fall2020" with two folders, Jobs and Support,
 created in the AWS Management Console.

Part II

Objective:

Using the AWS Management Console, copy 2 files (or your choice) to each of the 2 folders you created for your S3 buckets. (This means a total of 8 files will be moved to the S3 buckets.)

Documentation:

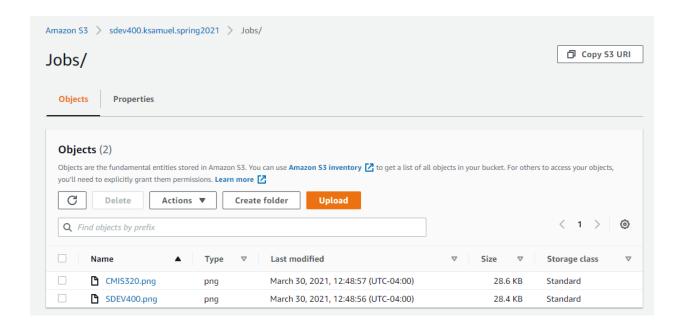


Figure 2.0: AWS Console: First S3 Bucket's Jobs Folder's Objects.

Two files uploaded to the Jobs folder in the sdev400.ksamuel.spring2021 (First S3
 Bucket) using the AWS Management Console.

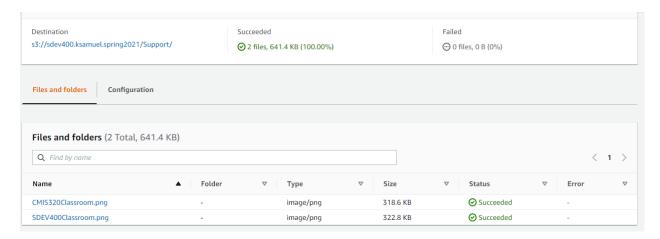


Figure 2.1: AWS Console: First S3 Bucket's Support' Folder's Objects.

- Two files uploaded to the **Support** folder in the **sdev400.ksamuel.spring2021** (First S3 Bucket) using the AWS Management Console.

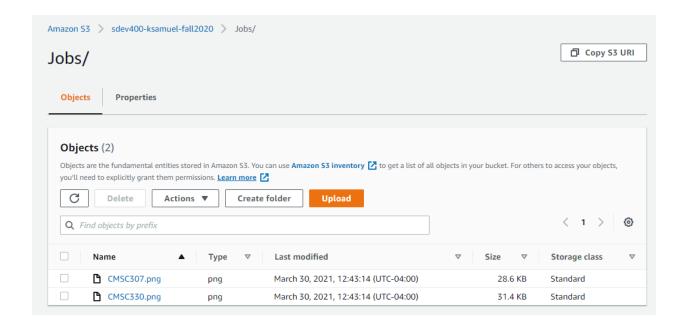


Figure 2.2: AWS Console: Second S3 Bucket's Jobs Folder's Objects.

Two files uploaded to the **Jobs** folder in the **sdev400.ksamuel.fall2020** (Second S3
 Bucket) using the AWS Management Console.

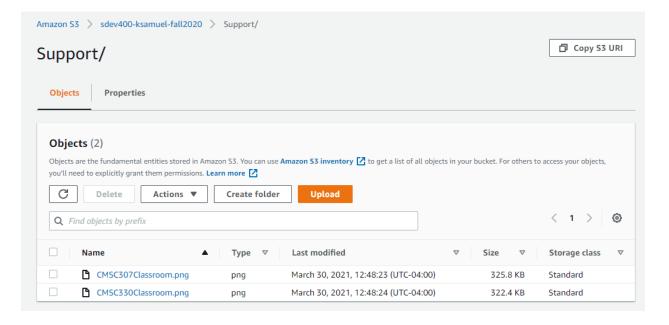


Figure 2.3: AWS Console: Second S3 Bucket's Support Folder's Objects.

Two files uploaded to the Support folder in the sdev400.ksamuel.fall2020 (Second S3
 Bucket) using the AWS Management Console.

Part III

Objective:

Using the Cloud9 IDE within your assigned AWS Educate classroom, write and provide documentation supporting a Python command line menu-driven interface application that performs the following AWS S3 functionality:

- a. Creates a S3 bucket with the name consisting of your firstname, lastname and a random 6- digit suffix. For example, the following would be a possible bucket name jimrobertson-321921.
- b. Puts objects in a previously created bucket.
- c. Deletes an object in a bucket.
- d. Deletes a bucket.
- e. Copies an object from one bucket to another.
- f. Downloads an existing object from a bucket.
- g. Exit the program. Upon exit, the application should list the date and time.

Disclaimer:

After extracting the files from SDEV400Python.zip, Please ensure that the "environment" folder is opened in VS code or is the current directory, run using_s3.py inside the "environment" folder or a parent folder of the "Homework1" folder and not the Homework1 folder. If not, the provided files for the upload to Bucket option will not load,

as the path for the provided files (lotus.jpg, sasuke.jpg,.etc) is provided in the code as: "Homework1/file_name"

Tests:

1: Create a Bucket

- Bucket Names must fit naming conventions mentioned in AWS' boto3 docs.
- All Buckets created through the CLI are public.

Input	Expected Output	Actual Output	P/F
menu option: 1	*lists menu options*1	*lists menu options*	Р
bucket name:			
ksamuel-322321	Select an option: 1	Select an option: 1	
	Enter a bucket name:	Enter a bucket name:	
	ksamuel-322321	ksamuel-322321	
	ksamuel-322321 Bucket	ksamuel-322321 Bucket	
	successfully created.	successfully created.	
	*prompts for repeat*2	*prompts for repeat*	

¹ Menu options - **1:** Create a Bucket, **2:** Upload an Object to a Bucket **3:** Delete an Object from a Bucket **4:** Delete Bucket **5:** Copy an Object to a Bucket **6:** Download a File Object from a Bucket **7:** Exit Program ² The user is prompted to repeat the current menu selection. If a current bucket is in use (uploading objects to, copy objects to, deleting objects from, downloading objects from) the user is prompted to use the current bucket again on repeat.

```
MENU

1: Create Bucket

2: Upload to Bucket

3: Delete from Bucket

4: Delete Bucket

5: Copy to Bucket

6: Download From Bucket

7: Exit Program

Select an option: 1
Enter a bucket name: ksamuel-322321
ksamuel-322321 Bucket successfully created.
```

Figure 3.0: AWS Cloud 9: Create a Bucket CLI.

Running the CLI and creating a Bucket called "ksamuel-322321"

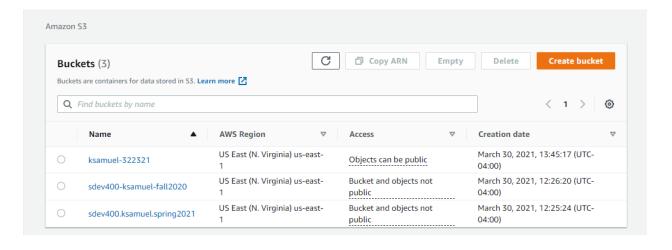


Figure 3.1: AWS Management Console: Create a Bucket Confirmation

Confirmation that creating a Bucket called "ksamuel-322321" was a success in AWS
 Console.

2: Upload an Object to a Bucket

 Supports adding File Objects inside of Folders, so long as the Folder Path provided is valid. Cannot create empty folders in CLI.

- Folder Paths must end in "/" and folder names can only be alphanumeric with spaces for simplicity. A valid path example: FirstFolder1/Nested Folder1/
- If Folder Path is not found, the folders listed in the path will automatically be created.
- Lists provided files (included in SDEV400Python.zip) to upload to Bucket.
- Checks for Buckets

Input	Expected Output	Actual Output	P/
			F
Menu option: 2	*lists menu options*	*lists menu options*	Р
Bucket option: 1			
Folder option: y	Select an option: 2	Select an option: 2	
Folder path:	Choose a Bucket: 1	Choose a Bucket: 1	
Random/	Location: anime-bucket-32431	Location: anime-bucket-32431	
File option: 2			
	Do you want to upload an	Do you want to upload an	
	Object into a folder? Y/N: y	Object into a folder? Y/N: y	
	Enter Folder Path: Random/	Enter Folder Path: Random/	
	The Object will be stored in	The Object will be stored in	
	Random/. If the folder does not	Random/. If the folder does not	
	exist, a new folder will be	exist, a new folder will be	
	created.	created.	

*list of provided files*3	*list of provided files*	
Select an option: 2	Select an option: 2	
code_names.txt was	code_names.txt was	
successfully uploaded to	successfully uploaded to	
anime-bucket-32431 in	anime-bucket-32431 in	
Random/	Random/	
prompt for repeat	*prompt for repeat*	

```
Select an option: 2
      BUCKETS
  1: anime-bucket-32431
  2: images-bucket-32432
  3: ksamuel-322321
  4: various-files-demo
Choose a bucket: 1
Location: anime-bucket-32431
Do you want to upload an Object to a folder? Y/N: y
Enter folder path: Random/
The Object will be stored here: Random/. If the folder does not exist, a new folder will be created.
      FILES
  1: aang.jpg
  2: code_names.txt
  3: large_US_cities.txt
  4: lotus.jpg
  5: rare_animals.txt
  6: whitewolf.jpg
  7: wraithapexlegends.jpg
Select an option: 2
code_names.txt was successfully uploaded to anime-bucket-32431 in Random/
Do you want to upload another Object to anime-bucket-32431? Y/N:
```

Figure 3.2: AWS Cloud 9: Upload an Object to a Bucket given a Folder Path CLI.

- Running the CLI and adding the code_names.txt file into a folder called "Random" in the "anime-bucket-32431" bucket.

³ Provided files: **1:** aang.jpg **2:** code_names,txt **3:** large_US_cities.txt **4:** lotus.jpg **5:** rare_animals.txt **6:** whitewolf.jpg **7:** wraithapexlegends.jpg

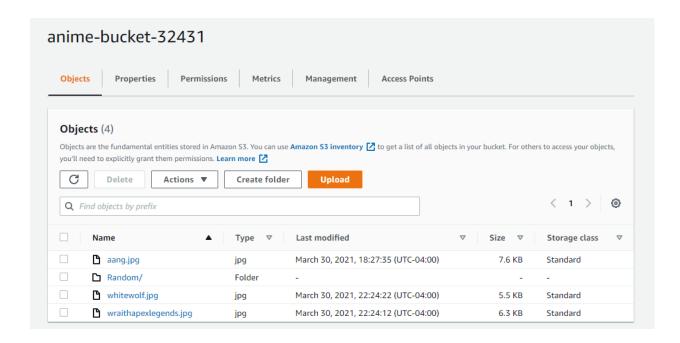


Figure 3.3: AWS Management Console: Create a Folder in a Bucket Confirmation

Confirmation that the "Random" folder was created inside anime-bucket-32431

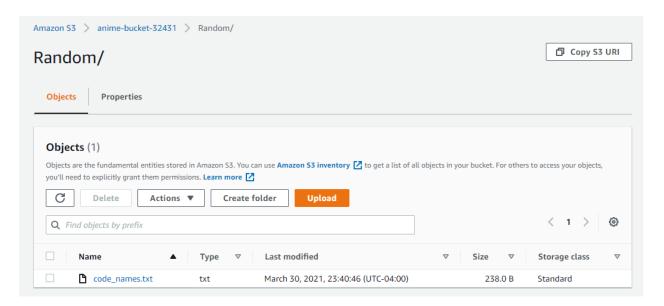


Figure 3.4: AWS Management Console: Upload an Object in the "Random" Folder Confirmation

- Confirmation that the code_names.txt file was uploaded into the "Random" folder **when**the Random folder was created inside anime-bucket-32431

3: Delete an Object From a Bucket

- Checks for empty Buckets or if there are Buckets
- Will prompt for delete confirmation.

Input	Expected Output	Actual Output	P/F
Menu option: 3	*lists menu options*	*lists menu options*	Р
Bucket option: 2			
Object option: 5	Select an option: 2	Select an option: 2	
	Choose a Bucket: 2	Choose a Bucket: 2	
	list of objects	*list of objects*	
	Select an option: 5	Select an option: 5	
	Support/CMSC330Classroom	Support/CMSC330Classroom.	
	.png was successfully deleted	png was successfully deleted	
	from	from	
	sdev-400-ksamuel-fall2020	sdev-400-ksamuel-fall2020	
	prompt for restart	*prompt for restart*	

```
BUCKETS

1: ksamuel-322321

2: sdev400-ksamuel-fall2020

3: sdev400.ksamuel.spring2021

Choose a bucket: 2

OBJECTS

1: Jobs/

2: Jobs/CMSC307.png

3: Support/

4: Support/CMSC307Classroom.png

5: Support/CMSC330Classroom.png

Select an option 5

Support/CMSC330Classroom.png was successfully deleted from sdev400-ksamuel-fall2020
```

- Running the CLI and deleting the CMSC330Classroom.png from a folder called "Support" in the "sdev400-ksamuel-fall2020" bucket.

4: Delete a Bucket

- Prompts user to delete all Objects inside of Buckets that are not empty, if the user chooses yes, all Objects inside the Bucket are deleted then the Bucket itself is deleted.
- Prompts for confirmation to delete all objects and Bucket, before deleting all objects.

Input	Expected Output	Actual Output	P/F
Menu option: 4	Select an option: 4	Select an option: 4	Р
Bucket option: 1	*lists buckets*	*lists buckets*	
Delete all object	Choose a Bucket: 1	Choose a Bucket: 1	
option: Y			
Confirm delete	This bucket needs to be	This bucket needs to be	
option: Y	emptied first. Would you like to	emptied first. Would you like to	
Repeat option: N	delete all objects in this bucket?	delete all objects in this	
	Y/N: y	bucket? Y/N: y	
	Are you sure you want to delete	Are you sure you want to	
	all of the objects in	delete all of the objects in	
	anime-bucket-32431? Y/N: y	anime-bucket-32431? Y/N: y	
	Successfully deleted all objects	Successfully deleted all objects	
	in anime-bucket-32431.	in anime-bucket-32431.	

Deleting bucket:	Deleting bucket:	
anime-bucket-32431	anime-bucket-32431	
Anime-bucket-32431 was	Anime-bucket-32431 was	
successfully deleted	successfully deleted	
Would you like to delete	Would you like to delete	
another bucket? Y/N: n	another bucket? Y/N: n	
menu	*menu*	
menu	*menu*	

```
Select an option: 4
BUCKETS

1: anime-bucket-32431
2: images-bucket-32432
3: ksamuel-322321
4: various-files-demo
Choose a bucket: 1
This bucket needs to be emptied first. Would you like to delete all objects in this bucket? Y/N: y
Are you sure you want to delete all of the objects in anime-bucket-32431? Y/N: y
Successfully deleted all buckets in anime-bucket-32431
Deleting Bucket: anime-bucket-32431
anime-bucket-32431 was successfully deleted.
Do you want to delete another Bucket? Y/N: n
```

Figure 3.6: AWS Cloud 9: Delete a Bucket CLI.

 Running the CLI and deleting all objects inside anime-bucket-32431 Bucket then deleting the bucket.

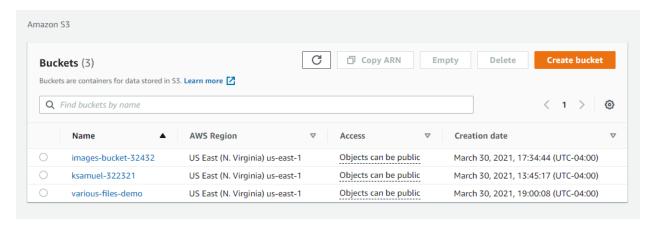


Figure 3.7: AWS Management Console: Delete an Object from Bucket CLI.

Confirmation that the anime-bucket-32431 Bucket was deleted using the AWS
 Management Console

5: Copy an Object to a Bucket

- Does not allow duplicate copies of files (same named files) inside of a Bucket, unless the
 Object is nested inside of a Folder.
- Checks for empty Buckets
- On repeat, the current Bucket is removed from the "Buckets" list, as there are no duplicate copies allowed.

Input	Expected Output	Actual Output	P/F
Menu option: 4	*lists menu options*	*lists menu options*	Р
Source Bucket	Select an option: 5	Select an option: 5	
option: 4	Select a Bucket to copy an	Select a Bucket to copy an	
Object option: 3	Object from:	Object from:	
Destination bucket: 2	*list buckets*	*list buckets*	

Repeat option: y	Select an option: 4	Select an option: 4
Source bucket option:	*list objects*	*list objects*
3	Select an option: 3	Select an option: 3
Object option: 1	Select a Destination Bucket:	Select a Destination Bucket:
Repeat option: n	*list of filtered buckets*4	*list of filtered buckets*
	Choose a Bucket: 2	Choose a Bucket: 2
	list of objects	*list of objects*
	Select an option: 5	Select an option: 5
	Source Bucket:	Source Bucket:
	various-files-demo	various-files-demo
	Selected Object:	Selected Object:
	large_US_cities.txt	large_US_cities.txt
	Destination Bucket:	Destination Bucket:
	images-bucket-32432	images-bucket-32432
	large_US_cities.txt was	large_US_cities.txt was
	successfully copied to	successfully copied to
	images-bucket-32432 from	images-bucket-32432 from
	various-files-demo	various-files-demo
	Do you want to copy another	Do you want to copy another
	Object into	Object into

⁴ A list of destination buckets which does not include the source bucket

images-bucket-32432? Y/N: y | images-bucket-32432? Y/N: y

Select a Bucket to copy an Select a Bucket to copy an

Object from: Object from:

list buckets | *list buckets*

Select an option: 3 Select an option: 3

list objects | *list objects*

Select an option: 1 Select an option: 1

Source Bucket: Source Bucket:

ksamuel-322321 ksamuel-322321

Selected Object: Selected Object:

aang.jpg aang.jpg

Destination Bucket: Destination Bucket:

images-bucket-32432 images-bucket-32432

Do you want to copy another Do you want to copy another

Object into Object into

images-bucket-32432? Y/N: **n** | images-bucket-32432? Y/N: **n**

```
Select an option: 5
Select a Bucket to copy an Object from:
      BUCKETS
  1: anime-bucket-32431
  2: images-bucket-32432
  3: ksamuel-322321
  4: various-files-demo
Choose a bucket: 4
      OBJECTS
1: aang.jpg
2: code_names.txt
3: large_US_cities.txt
4: lotus.jpg
5: whitewolf.jpg
6: wraithapexlegends.jpg
Select an option: 3
Select a destination bucket:
      BUCKETS
  1: anime-bucket-32431
  2: images-bucket-32432
  3: ksamuel-322321
Choose a bucket: 2
Source Bucket: various-files-demo
Selected Object: large_US_cities.txt
Destination Bucket: images-bucket-32432
large_US_cities.txt was successfully copied to images-bucket-32432 from various-files-demo
Do you want to copy another Object to images-bucket-32432? Y/N: y
```

Figure 3.8: AWS Cloud 9: Copy an Object to a Bucket CLI.

 Running the CLI and copying the large_US_cities.txt to the images-bucket-32432 from the various-files-demo bucket.

```
Select a Bucket to copy an Object from:

BUCKETS

1: anime-bucket-32431

3: ksamuel-322321

4: various-files-demo

Choose a bucket: 3

OBJECTS

1: aang.jpg

Select an option: 1

Source Bucket: ksamuel-322321

Selected Object: aang.jpg

Destination Bucket: images-bucket-32432

aang.jpg was successfully copied to images-bucket-32432 from ksamuel-322321

Do you want to copy another Object to images-bucket-32432? Y/N: n
```

Figure 3.9: AWS Cloud 9: Copy another Object to the same Bucket CLI.

- After choosing "Y" to copying another object to the images-bucket-32432, copying aang.jpg from the ksamuel-322321 bucket into the images-bucket-32432

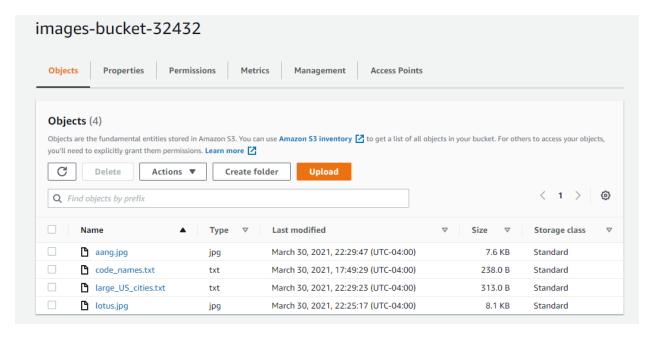


Figure 4.0: AWS Management Console: After Copy to images-bucket-32432

Confirmation that the aang.jpg and large_US_cities.txt files were copied in the
images-bucket-32432 bucket. Compare the last modified times to ensure these two files
were added together, with aang.jpg subsequently following large_US_cities.txt.

6: Download a File Object from a Bucket

- The user is able to download Objects that are a file (not a folder)
- The menu displays files inside of folders and nested folders
- When downloaded the string "copy_of_" is added before the file name into the current directory.

Input	Expected Output	Actual Output	P/F
Menu option: 6	Select an option: 6	Select an option: 6	Р

Bucket option 2	Select a Bucket: 3	Select a Bucket: 3	
Object option: 11	*List of files to download from	*List of files to download	
Repeat option: n	folders and Buckets*	from folders and Buckets*	
	Select an object: 11	Select an object: 11	
	wraithapexlegends.jpg was	wraithapexlegends.jpg	
	successfully downloaded as	was successfully	
	copy_of_wraithapexlegends.jpg	downloaded as	
	prompts for repeat	copy_of_wraithapexlegen	
		ds.jpg	
		prompts for repeat	

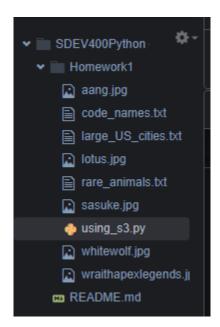


Figure 4.1: AWS Cloud 9: File Structure before Download

- .The current directory's folder structure before downloading a File Object from S3.

```
Select an option: 6
      BUCKETS
  1: anime-bucket-32431
 2: images-bucket-32432
 3: ksamuel-322321
 4: various-files-demo
Choose a bucket: 1
1: CMIS320.png in Random/AnotherFolder/
2: CMSC307.png in Random/AnotherFolder/
3: CMSC307Classroom.png in Random/AnotherFolder/
4: CMSC330.png in Random/AnotherFolder/
5: CMSC330Classroom.png in Random/AnotherFolder/
6: SDEV400.png in Random/AnotherFolder/
7: code_names.txt in Random/
8: aang.jpg
9: code_names.txt
10: whitewolf.jpg
11: wraithapexlegends.jpg
Select an option: 11
wraithapexlegends.jpg was successfully downloaded as: copy_of_wraithapexlegends.jpg
```

Figure 4.1: AWS Cloud 9: Downloading an Object from s3.

Running the CLI and downloading wraithapexlegends.jpg from anime-bucket-32431

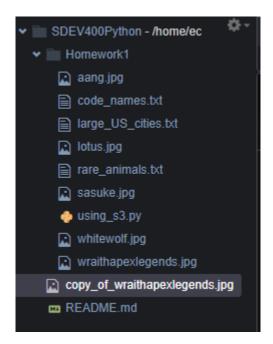


Figure 4.2: AWS Cloud 9: File Structure - Confirmation of Download

 Confirmation that a copy of wraithapexlegends.jpg was downloaded to the current directory as copy_of_wraithapexlegends.jpg

7: Exiting the Program

- Displays the date and time when exiting the program.

```
MENU

1: Create Bucket

2: Upload an Object to a Bucket

3: Delete an Object from a Bucket

4: Delete Bucket

5: Copy an Object to a Bucket

6: Download a File Object from a Bucket

7: Exit Program

Enter '<' to return to the menu at any time.

Select an option: 7

Timestamp: 2021-03-31 05:19:20.380428 Goodbye!
```

Figure 4.3: AWS Cloud 9: Exit Program CLI

Running the CLI and exiting the program.

8: Input Validation and Error Checking

- Consists of checking user input and catching errors and possible exceptions.

Create a Bucket Naming Conventions:

1. Entering a name that is already in use.

```
Select an option: 1
Enter a bucket name: ksamuel-322321
Invalid Bucket Name:
  - must be a unique Bucket name
  - must be between 3 and 63 characters
  - cannot contain spaces
  - cannot contain uppercase letters
  - cannot resemble an IP address
  - can only contain numbers, lowercase letters, periods and hyphens
Enter a new Bucket name: ksamuel-365465
ksamuel-365465
ksamuel-365465 Bucket successfully created.
Do you want to create another Bucket? Y/N: n
```

2. Entering a name with illegal characters

```
Select an option: 1
Enter a bucket name: 3843/??
Invalid Bucket Name:
- must be a unique Bucket name
- must be between 3 and 63 characters
- cannot contain spaces
- cannot contain uppercase letters
- cannot resemble an IP address
- can only contain numbers, lowercase letters, periods and hyphens
Enter a new Bucket name:
```

3. Entering a name out of range

```
Enter a new Bucket name: tr
Invalid Bucket Name:
- must be a unique Bucket name
- must be between 3 and 63 characters
- cannot contain spaces
- cannot contain uppercase letters
- cannot resemble an IP address
- can only contain numbers, lowercase letters, periods and hyphens
Enter a new Bucket name:
```

4. Entering a name with spaces

```
Select an option: 1
Enter a bucket name: New Bucket 3.0
Invalid Bucket Name:
- must be a unique Bucket name
- must be between 3 and 63 characters
- cannot contain spaces
- cannot contain uppercase letters
- cannot resemble an IP address
- can only contain numbers, lowercase letters, periods and hyphens
Enter a new Bucket name:
```

Upload an Object to a Folder Naming Conventions

1. Folder Path not ending in "/"

```
Choose a bucket: 3
Location: ksamuel-322321
Do you want to upload an Object to a folder? Y/N: Y
Enter folder path: Jobs
Please enter a valid path i.e 'Jobs/Work/'. For simplicity, folder names can only contain numbers, spaces, and letters
Enter new folder path: Jobs/
The Object will be stored here: Jobs/. If the folder does not exist, a new folder will be created.
     FILES
  1: aang.jpg
  2: code_names.txt
  3: large_US_cities.txt
 4: lotus.jpg
  5: rare_animals.txt
  6: whitewolf.jpg
  7: wraithapexlegends.jpg
Select an option: 5
rare_animals.txt was successfully uploaded to ksamuel-322321 in Jobs/
Do you want to upload another Object to ksamuel-322321? Y/N:
```

2. Folder Path containing anything other than spaces, letters, and numbers.

```
4: ksamuel-365465
5: various-files-demo
Choose a bucket: 3
Location: ksamuel-322321
Do you want to upload an Object to a folder? Y/N: Y
Enter folder path: /Jobs/
Folder names cannot begin with a character.
Please enter a valid path i.e 'Jobs/Work/'. For simplicity, folder names can only contain numbers, spaces, and letters:
Enter Folder Path: Jobs#Jobs
Please enter a valid path i.e 'Jobs/Work/'. For simplicity, folder names can only contain numbers, spaces, and letters
Enter new folder path: Jobs/Folder
Please enter a valid path i.e 'Jobs/Work/'. For simplicity, folder names can only contain numbers, spaces, and letters
Enter new folder path: |
```

Invalid/Valid menu options

1. Return to menu

2. Invalid menu option

```
6: Download a File Object from a Bucket
7: Exit Program
Enter '<' to return to the menu at any time.
Select an option: 9
Please enter a valid menu option
      MENU
1: Create Bucket
2: Upload an Object to a Bucket
3: Delete an Object from a Bucket
4: Delete Bucket
5: Copy an Object to a Bucket
6: Download a File Object from a Bucket
7: Exit Program
Enter '<' to return to the menu at any time.
Select an option: e
Please enter a valid menu option
```

3. Invalid Y/N response, allows "y","Y","n", and "N.

```
Choose a bucket: 3
Location: ksamuel-322321
Do you want to upload an Object to a folder? Y/N: j
Please enter a valid response.
Do you want to upload an Object to a folder? Y/N: n
     FILES
 1: aang.jpg
  2: code_names.txt
 3: large_US_cities.txt
 4: lotus.jpg
 5: rare_animals.txt
 6: whitewolf.jpg
 7: wraithapexlegends.jpg
Select an option: 3
large_US_cities.txt was successfully uploaded to ksamuel-322321
Do you want to upload another Object to ksamuel-322321? Y/N:
```