Unit 5.5B Graded Assignment:

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Daily Assignment :

Make a module of yesterday's task, name it "s3_module". Pass bucket name to the module using variable "bucket_name". Use the returned "s3_bucket" variable to add "day2/IaC/" directory to this bucket in the main module.

Answer:

Terraform Module Structure: main.tf

```
terraform {
  required_providers {
    aws = {
      source  = "hashicorp/aws"
      version = ">= 3.20.0"
    }
  }
}


provider "aws" {

  region  = "us-east-1"
}


module "s3_data" {
  source       = "./s3_data"
  bucket_name = var.bucket_name
}


output "s3_bucket_id" {
  value = module.s3_data.s3_bucket_name
}
```
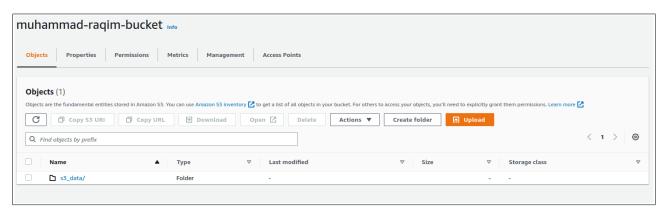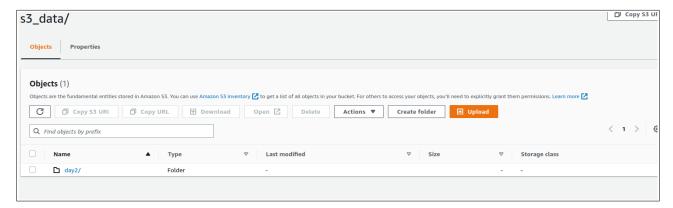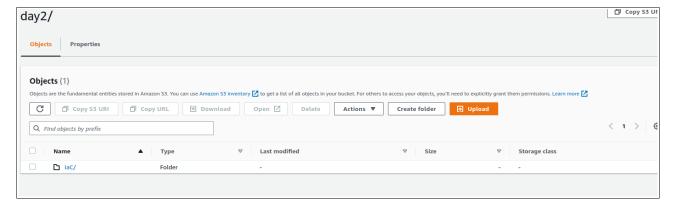
```
syedmuhammadraqimali@all-MS-7D35:~/Desktop/data_engineering_bootcamp_2303/tasks/5_data_pipelines/day_5_IaC/exercise4$ terraform apply
module.s3_data.aws_s3_bucket.s3_data: Refreshing state... [id=muhammad-raqim-bucket]
module.s3_data.aws_s3_object.folder: Refreshing state... [id=s3_data/scripts/]

Note: Objects have changed outside of Terraform

Terraform detected the following changes made outside of Terraform since the
last "terraform apply" which may have affected this plan:

  # module.s3_data.aws_s3_bucket.s3_data has been deleted
  - resource "aws_s3_bucket" "s3_data" {
      - id                          = "muhammad-raqim-bucket" -> null
        # (10 unchanged attributes hidden)

        # (3 unchanged blocks hidden)
    }


Unless you have made equivalent changes to your configuration, or ignored the
relevant attributes using ignore_changes, the following plan may include
actions to undo or respond to these changes.

─────────────────────────────────────────────────────────────────────────────

Terraform used the selected providers to generate the following execution plan.
Resource actions are indicated with the following symbols:
  + create

Terraform will perform the following actions:

  # module.s3_data.aws_s3_bucket.s3_data will be created
  + resource "aws_s3_bucket" "s3_data" {
      + acceleration_status         = (known after apply)
      + acl                         = (known after apply)
      + arn                         = (known after apply)
      + bucket                      = "muhammad-raqim-bucket"
      + bucket_domain_name          = (known after apply)
      + bucket_prefix               = (known after apply)
      + bucket_regional_domain_name = (known after apply)
      + force_destroy               = false
      + hosted_zone_id              = (known after apply)
      + id                          = (known after apply)
      + object_lock_enabled         = (known after apply)
      + policy                      = (known after apply)
      + region                      = (known after apply)
      + request_payer               = (known after apply)
      + tags_all                    = (known after apply)
      + website_domain              = (known after apply)
      + website_endpoint            = (known after apply)
```

```
      + website_endpoint            = (known after apply)
    }

  # module.s3_data.aws_s3_object.folder will be created
  + resource "aws_s3_object" "folder" {
      + acl                    = "private"
      + bucket                 = (known after apply)
      + bucket_key_enabled     = (known after apply)
      + content_type           = (known after apply)
      + etag                   = (known after apply)
      + force_destroy          = false
      + id                     = (known after apply)
      + key                    = "s3_data/day2/IaC/"
      + kms_key_id             = (known after apply)
      + server_side_encryption = (known after apply)
      + source                 = "/dev/null"
      + storage_class          = (known after apply)
      + tags_all               = (known after apply)
      + version_id             = (known after apply)
    }

Plan: 2 to add, 0 to change, 0 to destroy.

Changes to Outputs:
  ~ s3_bucket_id = "muhammad-raqim-bucket" -> (known after apply)

Do you want to perform these actions?
  Terraform will perform the actions described above.
  Only 'yes' will be accepted to approve.

  Enter a value: yes

module.s3_data.aws_s3_bucket.s3_data: Creating...
module.s3_data.aws_s3_bucket.s3_data: Creation complete after 5s [id=muhammad-raqim-bucket]
module.s3_data.aws_s3_object.folder: Creating...
module.s3_data.aws_s3_object.folder: Creation complete after 0s [id=s3_data/day2/IaC/]

Apply complete! Resources: 2 added, 0 changed, 0 destroyed.

Outputs:

syedmuhammadraqimali@all-MS-7D35:~/Desktop/data_engineering_bootcamp_2303/tasks/5_data_pipelines/day_5_IaC/exercise4$
```

Buckets (2) Info

Buckets are containers for data stored in S3. Learn more ↗

	Name ▲	AWS Region ▽	Access ▽	Creation date ▽
○	muhammad-raqim-bucket	US East (N. Virginia) us-east-1	Bucket and objects not public	May 22, 2023, 10:03:39 (UTC+05:00)
○	raqim-module5-day5	US East (N. Virginia) us-east-1	Bucket and objects not public	May 18, 2023, 12:43:30 (UTC+05:00)

[Copy ARN] [Empty] [Delete] [Create bucket]

---

muhammad-raqim-bucket Info

Objects | Properties | Permissions | Metrics | Management | Access Points

Objects (1)

Objects are the fundamental entities stored in Amazon S3. You can use Amazon S3 inventory ↗ to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. Learn more ↗

[Copy S3 URI] [Copy URL] [Download] [Open ↗] [Delete] [Actions ▼] [Create folder] [Upload]

	Name ▲	Type ▽	Last modified ▽	Size ▽	Storage class ▽
☐	📄 s3_data/	Folder	-	-	-

---

s3_data/

Copy S3 URI

Objects | Properties

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[Copy S3 URI] [Copy URL] [Download] [Open ↗] [Delete] [Actions ▼] [Create folder] [Upload]

	Name ▲	Type ▽	Last modified ▽	Size ▽	Storage class
☐	📄 day2/	Folder	-	-	-

---

day2/

Copy S3 URI

Objects | Properties

Objects (1)

Objects are the fundamental entities stored in Amazon S3. You can use Amazon S3 inventory ↗ to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. Learn more ↗

[Copy S3 URI] [Copy URL] [Download] [Open ↗] [Delete] [Actions ▼] [Create folder] [Upload]

	Name ▲	Type ▽	Last modified ▽	Size ▽	Storage class
☐	📄 IaC/	Folder	-	-	-

```
syedmuhammadraqimali@all-MS-7D35:~/Desktop/data_engineering_bootcamp_2303/tasks/5_data_pipelines/day_5_IaC/exercise4$ terraform destroy
module.s3_data.aws_s3_bucket.s3_data: Refreshing state... [id=muhammad-raqim-bucket]
module.s3_data.aws_s3_object.folder: Refreshing state... [id=s3_data/day2/IaC/]

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
  - destroy

Terraform will perform the following actions:

  # module.s3_data.aws_s3_bucket.s3_data will be destroyed
  - resource "aws_s3_bucket" "s3_data" {
      - arn                         = "arn:aws:s3:::muhammad-raqim-bucket" -> null
      - bucket                      = "muhammad-raqim-bucket" -> null
      - bucket_domain_name          = "muhammad-raqim-bucket.s3.amazonaws.com" -> null
      - bucket_regional_domain_name = "muhammad-raqim-bucket.s3.amazonaws.com" -> null
      - force_destroy               = false -> null
      - hosted_zone_id              = "Z3AQBSTGFYJSTF" -> null
      - id                          = "muhammad-raqim-bucket" -> null
      - object_lock_enabled         = false -> null
      - region                      = "us-east-1" -> null
      - request_payer               = "BucketOwner" -> null
      - tags                        = {} -> null
      - tags_all                    = {} -> null

      - grant {
          - id          = "1be2c3be156dc8eb8c23cd6f02d8976e36f08dd48da94c8417d448585c6154ef" -> null
          - permissions = [
              - "FULL_CONTROL",
            ] -> null
          - type        = "CanonicalUser" -> null
        }

      - server_side_encryption_configuration {
          - rule {
              - bucket_key_enabled = false -> null

              - apply_server_side_encryption_by_default {
                  - sse_algorithm = "AES256" -> null
                }
            }
        }

      - versioning {
          - enabled    = false -> null
          - mfa_delete = false -> null
        }
    }

  # module.s3_data.aws_s3_object.folder will be destroyed
  - resource "aws_s3_object" "folder" {
      - acl               = "private" -> null
      - bucket            = "muhammad-raqim-bucket" -> null
      - bucket_key_enabled = false -> null
      - content_type      = "binary/octet-stream" -> null
```

```
      - type        = "CanonicalUser" -> null
        }

      - server_side_encryption_configuration {
          - rule {
              - bucket_key_enabled = false -> null

              - apply_server_side_encryption_by_default {
                  - sse_algorithm = "AES256" -> null
                }
            }
        }

      - versioning {
          - enabled    = false -> null
          - mfa_delete = false -> null
        }
    }

  # module.s3_data.aws_s3_object.folder will be destroyed
  - resource "aws_s3_object" "folder" {
      - acl                     = "private" -> null
      - bucket                  = "muhammad-raqim-bucket" -> null
      - bucket_key_enabled      = false -> null
      - content_type            = "binary/octet-stream" -> null
      - etag                    = "d41d8cd98f00b204e9800998ecf8427e" -> null
      - force_destroy           = false -> null
      - id                      = "s3_data/day2/IaC/" -> null
      - key                     = "s3_data/day2/IaC/" -> null
      - metadata                = {} -> null
      - server_side_encryption  = "AES256" -> null
      - source                  = "/dev/null" -> null
      - storage_class           = "STANDARD" -> null
      - tags                    = {} -> null
      - tags_all                = {} -> null
    }

Plan: 0 to add, 0 to change, 2 to destroy.

Changes to Outputs:
  - s3_bucket_id = "muhammad-raqim-bucket" -> null

Do you really want to destroy all resources?
  Terraform will destroy all your managed infrastructure, as shown above.
  There is no undo. Only 'yes' will be accepted to confirm.

  Enter a value: yes

module.s3_data.aws_s3_object.folder: Destroying... [id=s3_data/day2/IaC/]
module.s3_data.aws_s3_object.folder: Destruction complete after 1s
module.s3_data.aws_s3_bucket.s3_data: Destroying... [id=muhammad-raqim-bucket]
module.s3_data.aws_s3_bucket.s3_data: Destruction complete after 0s

Destroy complete! Resources: 2 destroyed.
syedmuhammadraqimali@all-MS-7D35:~/Desktop/data_engineering_bootcamp_2303/tasks/5_data_pipelines/day_5_IaC/exercise4$ 
```

▼ **Account snapshot**
Last updated: May 20, 2023 by Storage Lens. Metrics are generated every 24 hours. Learn more 🔗

View Storage Lens dashboard

Total storage	Object count	Average object size	
328.6 KB	40	8.2 KB	You can enable advanced metrics in the "default-account-dashboard" configuration.

Buckets (1) Info
Buckets are containers for data stored in S3. Learn more 🔗

🔄   Copy ARN   Empty   Delete   **Create bucket**

🔍 Find buckets by name

< 1 > ⚙

	Name ▲	AWS Region ▽	Access ▽	Creation date ▽
○	raqim-module5-day5	US East (N. Virginia) us-east-1	Bucket and objects not public	May 18, 2023, 12:43:30 (UTC+05:00)