Terraform:
==========
1) What is terraform?
Terraform is an open source IAC(Infrastructure as code) tool,developed by hashicorp.
with the help of terraform we can create,delete,modify our infrastructure.
Terraform uses HCL language.

2) What are providers in terraform?
Providers is a plugin which will download the dependencies to communicate with the resources.It will communicate by using API calls.

3) What is resource in terraform?
Resources can be any thing which we want to be create using terraform.
It can be file,s3,ec2,vpc etc.

4) Types of providers in terraform?
1) Official --> provided by terraform
2) partner --> provided by third party vendors
3) Community --> provided by people like us.

5) what is terraform registry?
Terraform registry is a public repository where we can find all the providers supported by terraform.

6) Difference between Terraform and Cloudformation?
Both are used for IAC.
Cloudformation is restricted only for aws.
Terraform can be used for multiple clouds.

7) Example for sample terraform template?
```
resource "local_file" "file-name" {
filename = "pets.txt"
content = "I love cats!"
}
```

8) Explain few terraform commands?
Terraform init --> to initiliaze terraform and download the dependecies for the resources.
Terraform plan --> To dry run or show how terraform will be executing the resource file.
Terraform apply --> To execute and make changes of the resource file.
Terraform output --> to print the output present in the resource file
Terraform validate --> to check the syntax is correct or not
Terraform fmt (format) --> to correct the format of the configuration file
Terraform show --> to display the current state of the infrastructure.
Terraform providers --> to see the list of providers used in configuration file
Terraform refresh --> used to sync terraform with real world infrastructure
Terraform graph --> to create visual representation of dependency

9)What are different variables in terraform?
1) By using varibles.tf file
2) By using interactive mode (This will get activated if we dont pass defa;ult value in variable.tf file)
3) Command line flags
--> terraform apply - var "filename=/root/pets.txt" -var "prefix=MR"
4) Environment variables
--> export TF_VAR_filename="/root.pets.txt"
--> export TF_VAR_prefix= "MR"
--> Set-Item -Path env:TF_VAR_filename -Value 'wild.txt'
terraform apply
5) varibale definition file (Should be end with terraform.tfvars/terraform.tfvars.json)
--> for automatically loaded file name *.auto.tfvars/*.auto.tfvars.json
--> if we are saving the file with other name like varible.tfvars then we need to pass this in CLI
--> terraform apply -var-file varibale.tfvars

10) varibale definition precedence in terraform?

Order	Option
1	Environment variables
2	Terraform.tfvars
3	*.auto.tfvars(alphabetical order)
4	-var or -var-file (Command line flags)

11) Sample terraform template with varibles file?
Main.tf:
=======
```
resource "local_file" "file-name" {
filename = var.filename
content = var.content
}
```

variable.tf:
==========
```
variable "filename" {
default =""root/pets.txt"   --> Default value
type =  --> type of variable
description =   --> optional but can define why the varible is used for
}
variable "content" {
default ="I Love Cats!"   --> Default value
type =  --> type of variable
description =   --> optional but can define why the varible is used for
}
```

12) What is resource attribute reference?
Resource attriibute references are used to link two resources.

13) What is terraform.tfstate file ?
Terraform state:
==========
Terraform state file will have the complete record of the infra created by terraform.

State file is considered as a blue print of all the resources terraform manages.
terraform.tfstate will be the name of the file and this will created only after using terraform apply command.

When we excute terraform apply then terraform will check for the state file config and main.tf configuration and make the changes.
If both the files are in sync and we are again trying to execute terraform apply then terraform will not make the changes but show "Terraform has compared your real infrastructure against your configuration and found no differences, so no changes are needed."

Each resource created by terraform will have the unique ID.
State files also capture the Metadata of the configuration file.
State file will helps for better performance because of the cache of the data.
state file benifits in collborating with different team members.
State files should be shared in the remote backend place so that team can access the state file.
State files also store the sensitive data so not recommended to store in public repo's like github,gitlab.
Terraform state is a json format file,never try to edit the state file manually.

14) What is mutable and immutable infrastructure in terraform?
Terraform as a IAC tool uses immutable infrastructure stratgey.
Immutable means deleting the older infra and creating a newer one with new update.
Mutable means using the existing infra and updating the system with newer version.

15) what are lifecycle rules in terraform?
Lifecycles rules are used to control the creation,deletion of the infrastrutuce.

we have 4 lifecycle rules:
1) Deleting before creation --> default rules
2) create_before_destory
3) revent_destory
4) ignore_changes

16) What is data sources in terraform?
Data source are used to read the content of the existing infrastructure.

17)Difference between resources and data ?
Resources starts with keyword resource
resource are used to create,modify,delete the infra

Data source strat with keyword data.
data sources are used to read the infrastructure.

18)what are meta-arguments in terraform?
Meta arguments are used if we want to create multiple resources.

Meta arguments can be used within any resource block to change the behaviour of the resources.
Examples for meta arguments:

1) Depends_on
2) lifecycle rules
3) Count
4) For_each

19) How to use specific version providers in terraform?
We can use version constraints in terraform.
By default terraform will always try to downlaod the latest version of provider available from registry.
To make sure to use the specific version provider we can add the provider block in configuration.
Example:
=======

```
terraform {
  required_providers {
    local = {
      source = "hashicorp/local"
      version = "2.3.0"
    }
  }
}
```

version = "2.3.0" --> download the exact version
version = "!=2.3.0" --> will not use the mentioned version
version = "< 2.3.0" --> lesses than the mention version
version = "> 2.3.0" --> greater than the given version
version = "~> 2.3.0" --> specific version or higher version.

20) Terraform file to create user,create policy and attach to the user.

```
resource "aws_iam_user" "Admin-user" {
  name = "lucy"
  tags = {
    "description" = "Technical Team Lead"
  }
}
resource "aws_iam_policy" "adminuser" {
  name   = "AdminUsers"
  policy = file("admin-policy.json")
}

resource "aws_iam_user_policy_attachment" "lucy-admin-access" {
  user       = aws_iam_user.Admin-user.name
  policy_arn = aws_iam_policy.adminuser.arn
}
```

21) What is remote state,remote backend and state locking in terraform?
We use s3,terraform storage,hashicorp consul to store the state file.
State locking is used to lock the state file so that no two users can execute the state file at the same point of time.
We can use s3 as remote backend and dynamo db for state locking.

22) Terraform template form s3 backend and state locking?
Create s3 using terraform:
==========
```
resource "aws_s3_bucket" "s3_bucket" {

    bucket = "s3backend"
    acl = "private"
}
```

Create dynamo db using terraform:
==========
```
resource "aws_dynamodb_table" "dynamodb-terraform-state-lock" {
  name = "terraform-state-lock-dynamo"
  hash_key = "LockID"
  read_capacity = 20
  write_capacity = 20

  attribute {
    name = "LockID"
    type = "S"
  }
}
```

S3 as backend for terraform.tfstate file:
==========
```
terraform {
  backend "s3" {
    bucket = "s3backend"
    dynamodb_table = "terraform-state-lock-dynamo"
    key    = "terraform.tfstate"
    region = "us-east-1"
  }
}
```

23) List few state commands in terraform?
```
Terraform show             --> To show the resources of the state file
Terraform state list       --> List resources in the state
Terraform mv               --> Move an item in the state
Terraform pull             --> Pull current state and output to stdout
Terraform push             --> Update remote state from a local state
file
Terraform replace-provider --> Replace provider in the state
Terraform rm               --> Remove instances from the state
Terraform show             --> Show a resource in the state
```

24) What are terraform provisioners?
Terraform provisioners allow us to execute command,scripts on remote
machines or
local place were terraform is installed.
Provisioners will be written inside the resource blocks.
We have two types of provisioners
1) Remote provisioner
This is used to execute commands at the run time on remote machines.
2) Local provisioner

This is used to execute commands at the run time on local machine.
(means where terraform is installed)

25) What are the different behaviours of terraform provisioners?
1) Create at the time creating resource (Default)
2) create at the time of destroyin resource (when = destroy)
3) on_failure = fail --> to create the resource if the script gets failed.(But terraform will mark the reource as tainted)
4) On_fail = continue --> to create the resource and ignore the changes.

26) What is taint and untaint in terraform?
Terraform will marked the resources as tainted if there was issue at the time of creation.
when a resource is marked as tainted then it means terraform will replace the reource when we use terraform apply.
We can manually mark that resource as taint in terraform so that it will be replaced next time when use apply.
Untainted is to undo the tainted status.

27) how to debug terraform resource?
We can use log file which can be created manually.
To get the temporary logs,we can use
export TF_LOG=TRACE --> Linux
Set-Item -Path env:TF_LOG -value "TRACE" --> Windows

To store the logs permanently then we can export a path
export TF_LOG_PATH=/tmp/terraform.log
Set-Item -Path env:TF_LOG_PATH -value "terraform.log"

28) What is terraform import?
Terraform import is used to import the existing infrastructure in terraform state file.
Once import is done then we cna be able to create/delete and manage the infrastructure.
In order to import any resource we need to write the resource details in configuration file.
terraform import aws_instance.<name> instance_id