1) Explain all the ways you would optimize the following Update function:

```
private void Update()
{
    GameObject[] sceneObjects = GameObject.FindGameObjectsWithTag("scene");

    foreach (GameObject i in sceneObjects)
    {
        if (Vector3.Distance(i.transform.position, new Vector3(0,0,0)) > 5)
        {
            i.transform.position = new Vector3(0, 0, 0);
        }
        else
        {
            i.transform.position += new Vector3(1, 1, 1);
        }

    }

}
```

Below is the code on how I would optimize the code.

```
GameObject[] sceneObjects;

void Start()
{
    sceneObjects = GameObject.FindGameObjectsWithTag("scene");
}

void Update()
{
    foreach (GameObject i in sceneObjects)
    {
        if (Vector3.Distance(i.transform.position, Vector3.zero) > 5)
        {
            i.transform.position = Vector3.zero;
        }
        else
        {
            i.transform.position += Vector3.one;
        }
    }
}
```

1. I removed GameObject[] sceneObjects = GameObject.FindGameObjectsWithTag("scene"); out of Update() and put it in Start() since it is very resource intensive and does not need to be called every frame. I also cache the array so that it can be used later. Another way that is less expensive is to set

the sceneObjects public and manually set it in the inspector but this is only viable if there aren't a lot of game objects.

2. Instead of using new Vector3(0, 0, 0) and new Vector3(1, 1, 1) I use Vector3.zero and Vector3.one because the new operator creates a new instance.
3. Another way to optimize this code is if this doesn't need to be called every frame, have it called every x frames. Below is a picture of the code.

```
GameObject[] sceneObjects;

int interval = 3;

void Start()
{
    sceneObjects = GameObject.FindGameObjectsWithTag("scene");
}

void Update()
{

    if (Time.frameCount % interval == 0)
    {
        foreach (GameObject i in sceneObjects)
        {
            if (Vector3.Distance(i.transform.position, Vector3.zero) > 5)
            {
                i.transform.position = Vector3.zero;
            }
            else
            {
                i.transform.position += Vector3.one;
            }
        }
    }
}
```