**Unity Certification Preparation:**

**C# Programming**

**Time.DeltaTime**

**Orlando Unity3d Development Meetup**

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# **12.0 Time.DeltaTime**

At this point. We need to discuss a very important concept called **Time.DeltaTime**. Which confuses a lot of people !? Whenever we move an object we use the **void Update()** method or function which is inherited from the MonoBehaviour Class. What unity does is call the update method every frame.

Now the problem is. Suppose you have a computer which is fast, and it updates **60 fps** (frames per second). **The Frame Rate (FPS)** or Frequency…is how quickly (how many times per second) your computer can (process and) send an image to your screen in 1 second. The higher the frame rate the smoother less jerky the image will be. Which means the update method update gets called 60 times every second. Now suppose you have a friend who has a slow computer, and his computer runs at 30 fps for the same game.

Now for our application if we want to move our object in the scene by a speed of 0.01 units. On my laptop operating at 60 fps. This means my object will move a distance of 60 \* 0.01 = 0.6 units. However, on your friend’s computer because he/she only gets 30 fps, their object will only move a distance of 30\*0.01 = 0.3 units. As you can see if we depend on the frame rate to render an image. On a faster computer our object will move further, and on a slower computer our object will move shorter.

Therefore, for both friends to have the same universal experience, so the game objects render’s the same regardless of what a laptop/pc frame rate is we apply **Time.DeltaTime**.

# **12.1 What is Time.DeltaTime ?**

**Time.deltatime => is the time difference between the PREVIOUS and the CURRENT frame**. It is also the equivalent time difference between each function update call…because it is called every frame.

* So, if on my laptop 60 frames are called per second => Then 1 frame takes 1/60th of second =0.016s
* So, if on my laptop 30 frames are called per second => Then 1 frame takes 1/30th of second =0.033s

Now if I want my player to move a distance of 5 units in 1 second. I cannot move it 5 units per frame. Because in 1 second I get 60 frames

* Distance takes 5 units = 1 second i.e. 5 units per second
* 60 frames = 1 second
* 1 frame = 1/60th second = 0.016 seconds

We have to work out how far to move our object in each and every frame, so that at the end of 1 second the object has moved 5 units

So, if Speed = Distance / Time.

Distance = Speed \* Time.deltaTime = 5 \* 0.016 = 5 \* ( 1/60 ) = ( 1 / 12) = **0.083333**

So, this is the amount we are moving our object in 1 second = the distance covered to move our object per frame = 0.083

So, after 60 frames in 1 second we get = 60 \* 0.083 = 5 units

So, the same thing applies if we get 30 frames per second

After 30 frames in 1 s we get = 30 \* (5/30)

**0.083333333**

**0.166666667**

# **Glossary**

# **Resources**

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