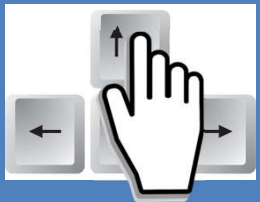


# Game Loop

Benutzer  
Eingaben



Spiele  
Mechanik



Spielwelt  
darstellen

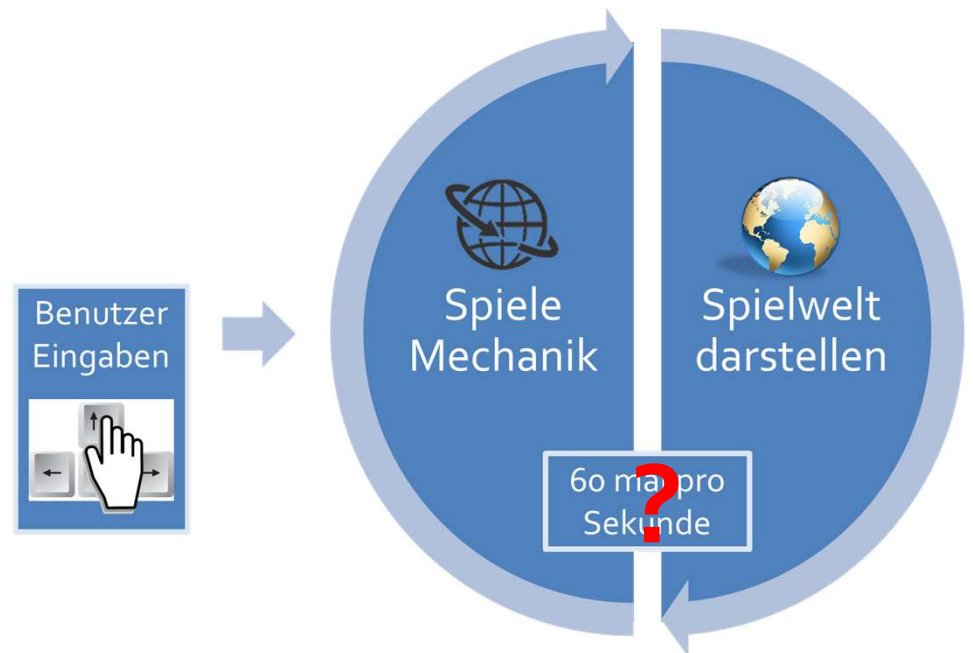


60 mal pro  
Sekunde

# Interactive Application

- Program must react on user input while updating state and visualization

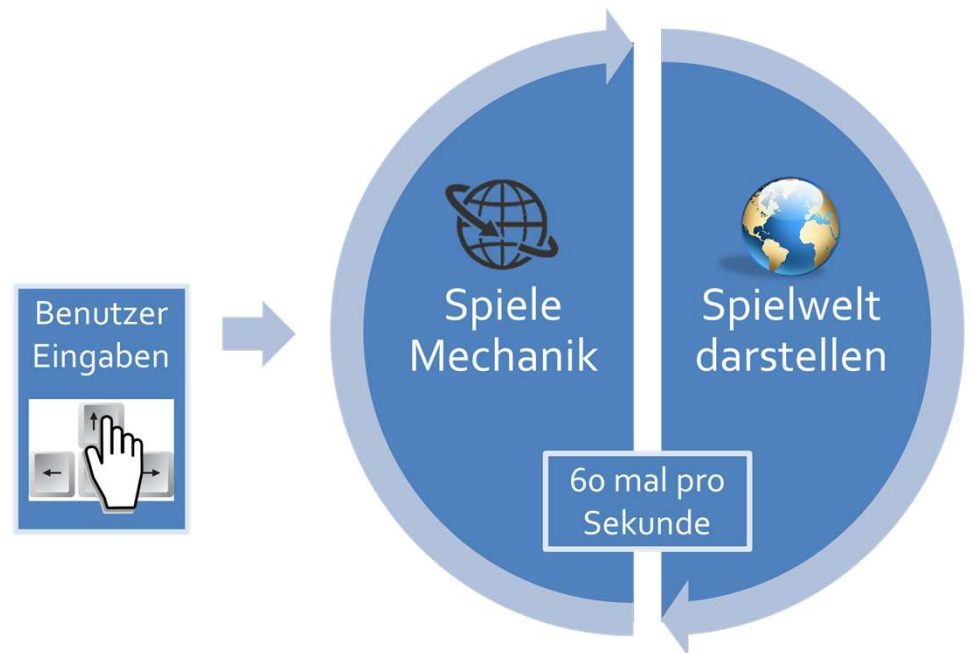
```
while(not finished)
{
    input = getInput();
    UpdateGameState(input);
    DrawGameWorld();
}
```



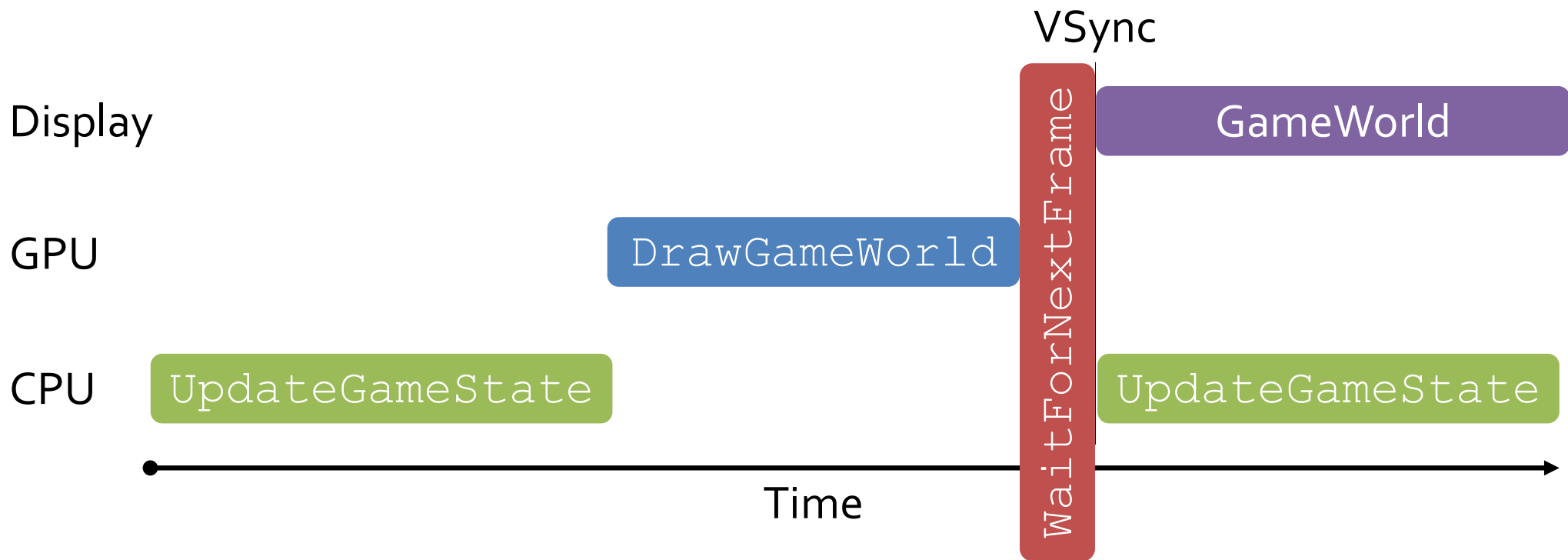
# Interactive Application with 60FPS

- Program must react on user input while updating state and visualization
- Wait for new frame

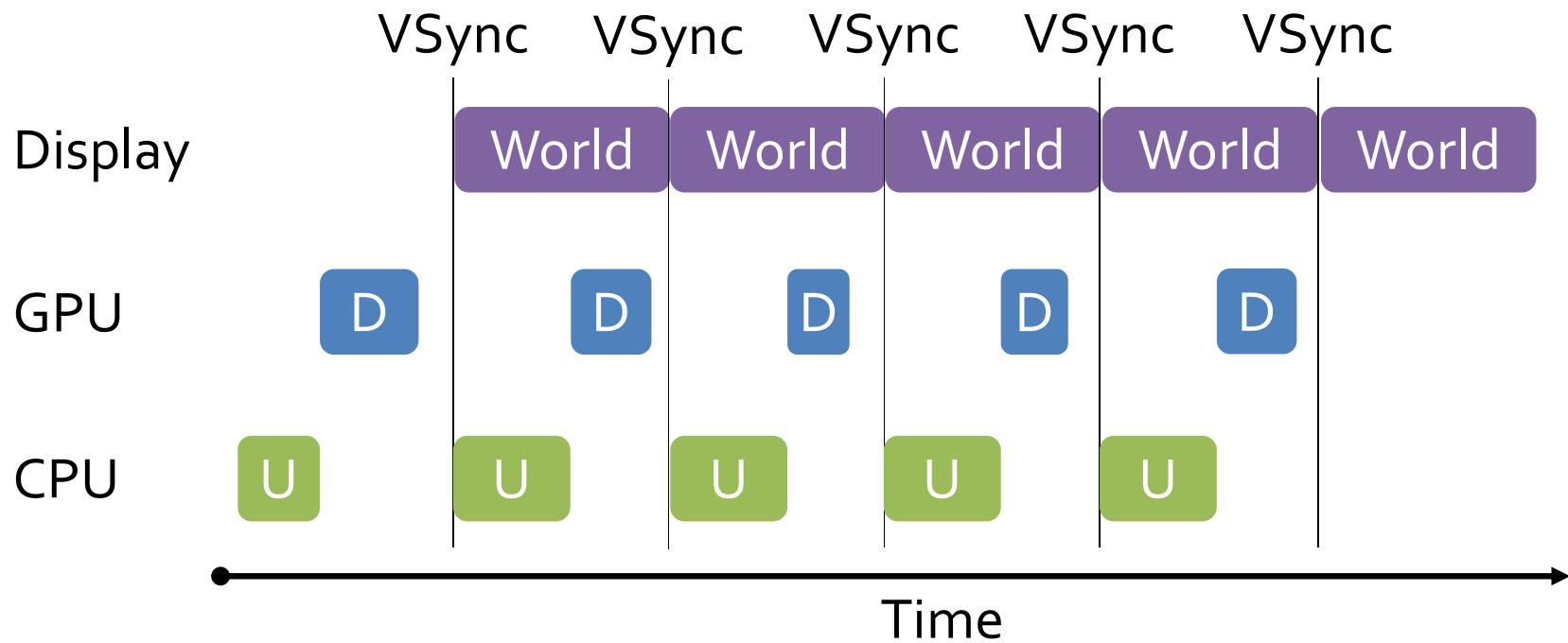
```
while(not finished)
{
    input = getInput();
    UpdateGameState(input);
    DrawGameWorld();
    WaitForNextFrame();
}
```



# Vertical Synchronisation (VSync)

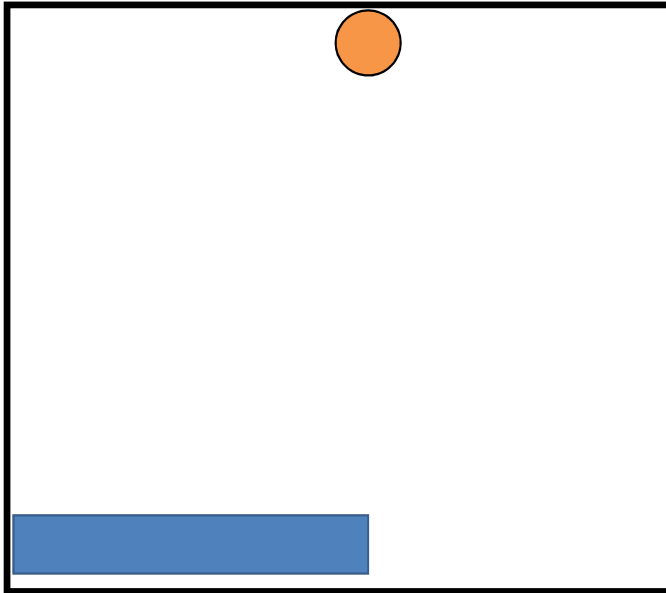


# Vertical Synchronisation (VSync)



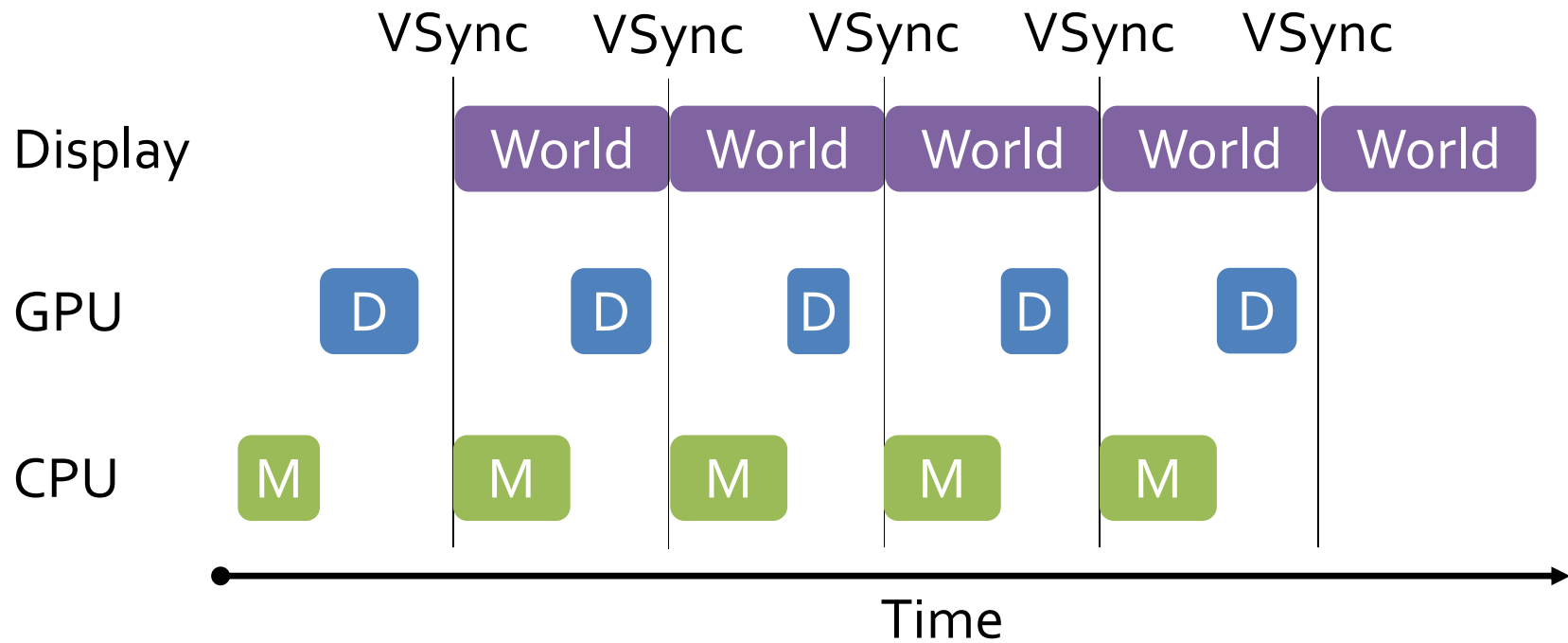
# Animation – Idea?

- Move animated objects each frame a bit



```
y = 1;  
while(not finished)  
{  
    ...  
    y -= 0.1;  
    DrawBall(y) ;  
    ...  
}
```

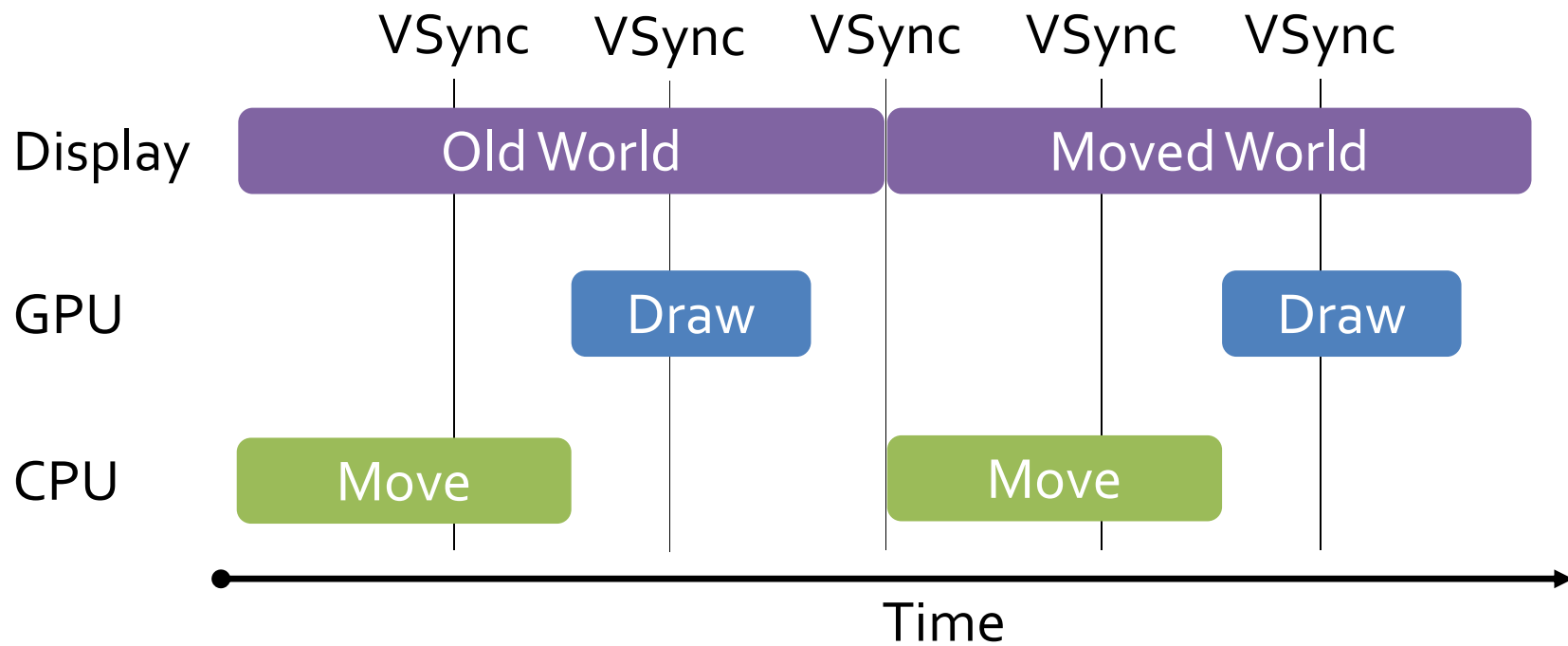
# Animation – Movement in Update





# Speed Cheating

- If PC/GPU is very slow player gets more time to react



# Frame Rate Independent Animation

- Animation speed **should not** change with PC speed
- Idea: use system time to scale all movements

```
y = 1;
while(not finished)
{
    ...
    t = GetTime();
    tFrame = t - tLast;
    y -= tFrame * 0.1;
    tLast = t;
    DrawBall(y);
    ...
}
```