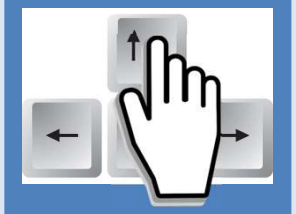
Game Loop

Benutzer Eingaben



Spiele Mechanik

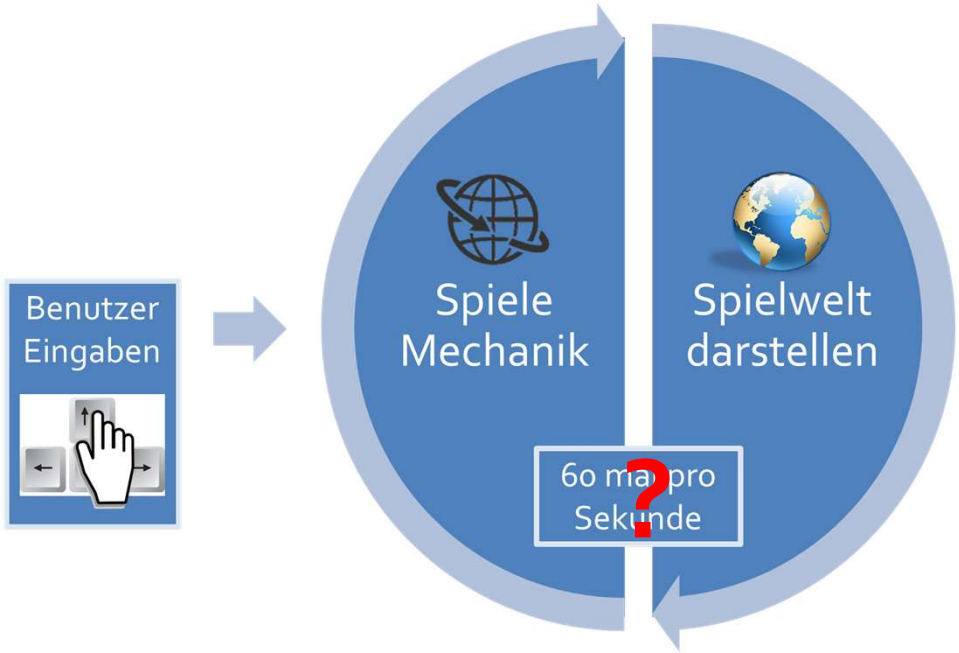
Spielwelt darstellen

60 mal pro Sekunde

Interactive Application

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

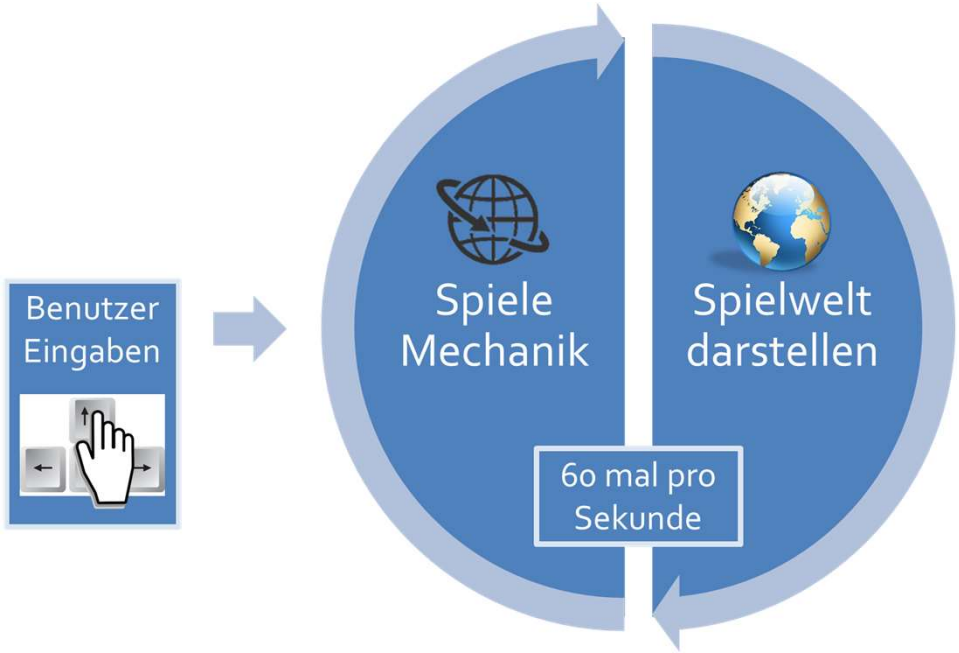
```
while(not finished)
{
   input = getInput();
   UpdateGameState(input)
   DrawGameWorld();
}
```



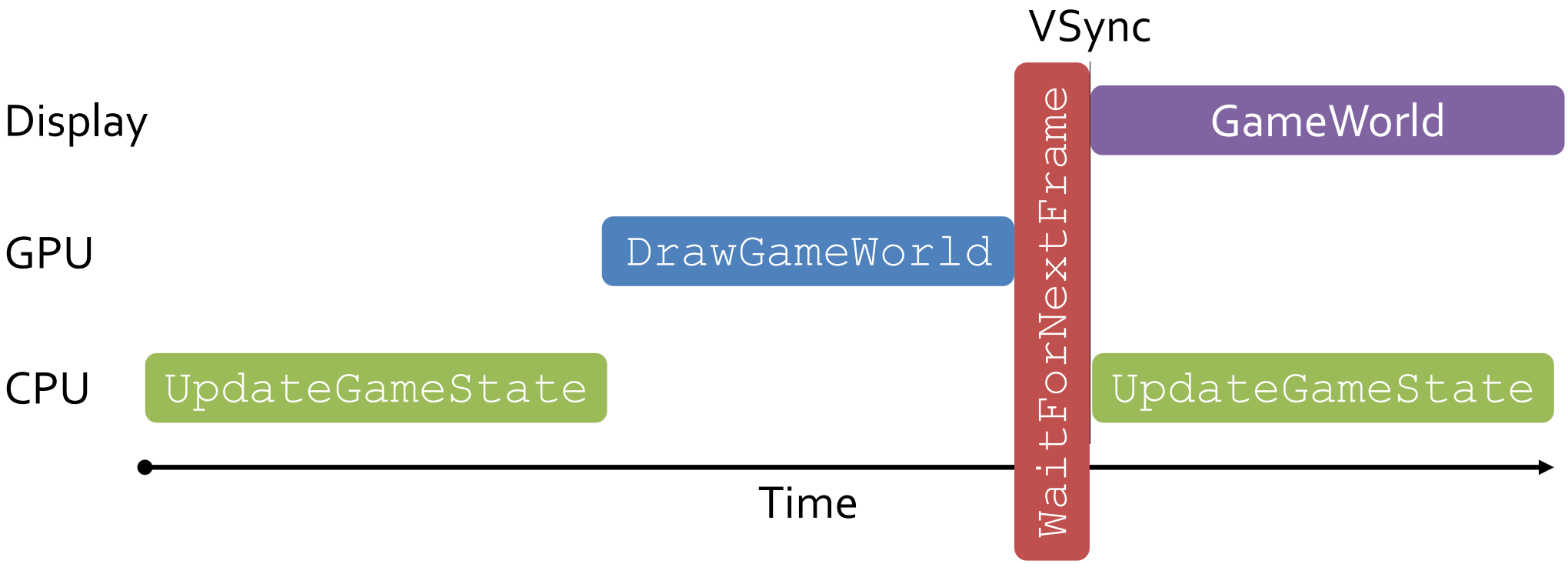
Interactive Application with 60FPS

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

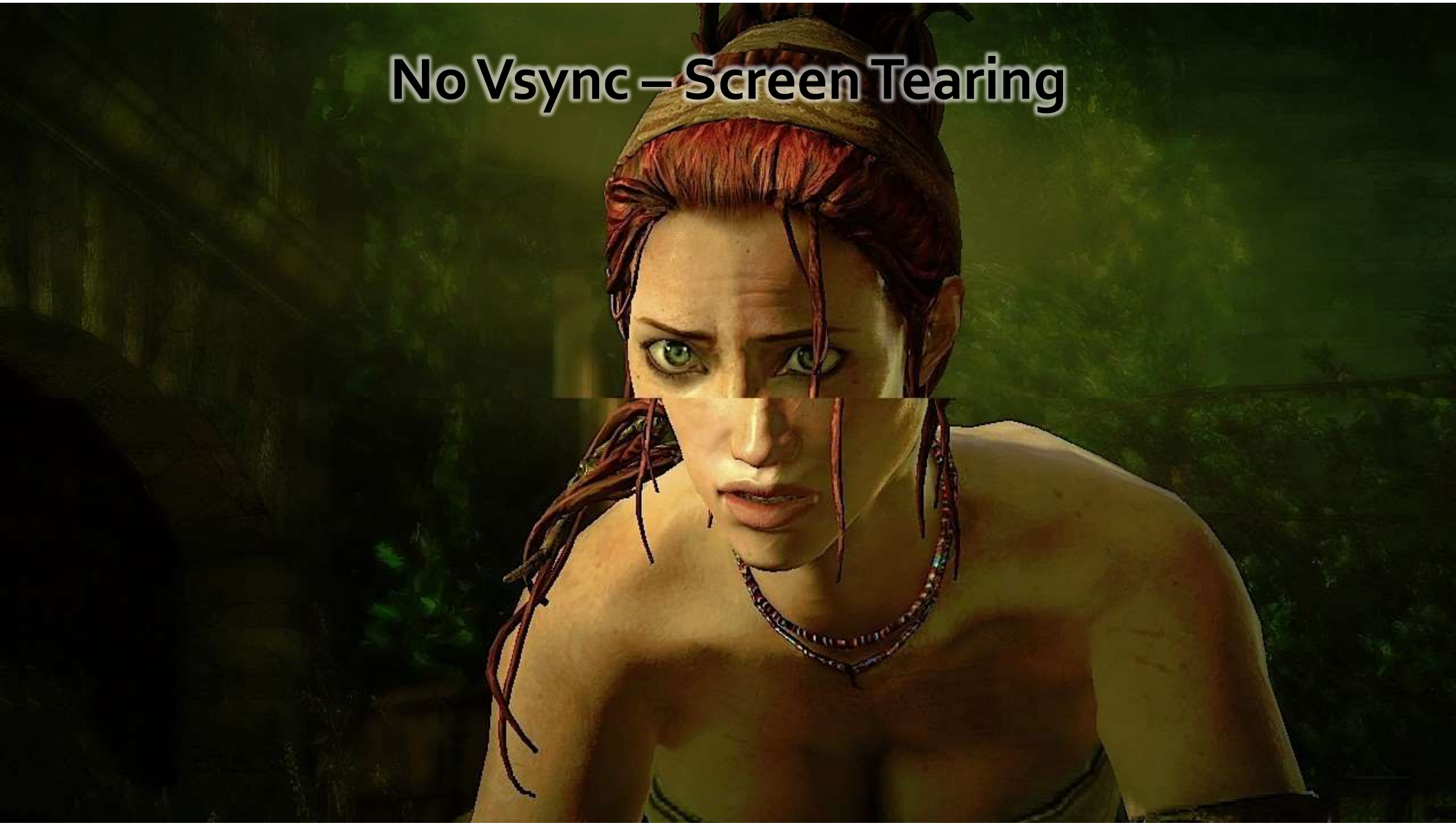
```
while(not finished)
{
   input = getInput();
   UpdateGameState(input)
   DrawGameWorld();
   WaitForNextFrame();
}
```



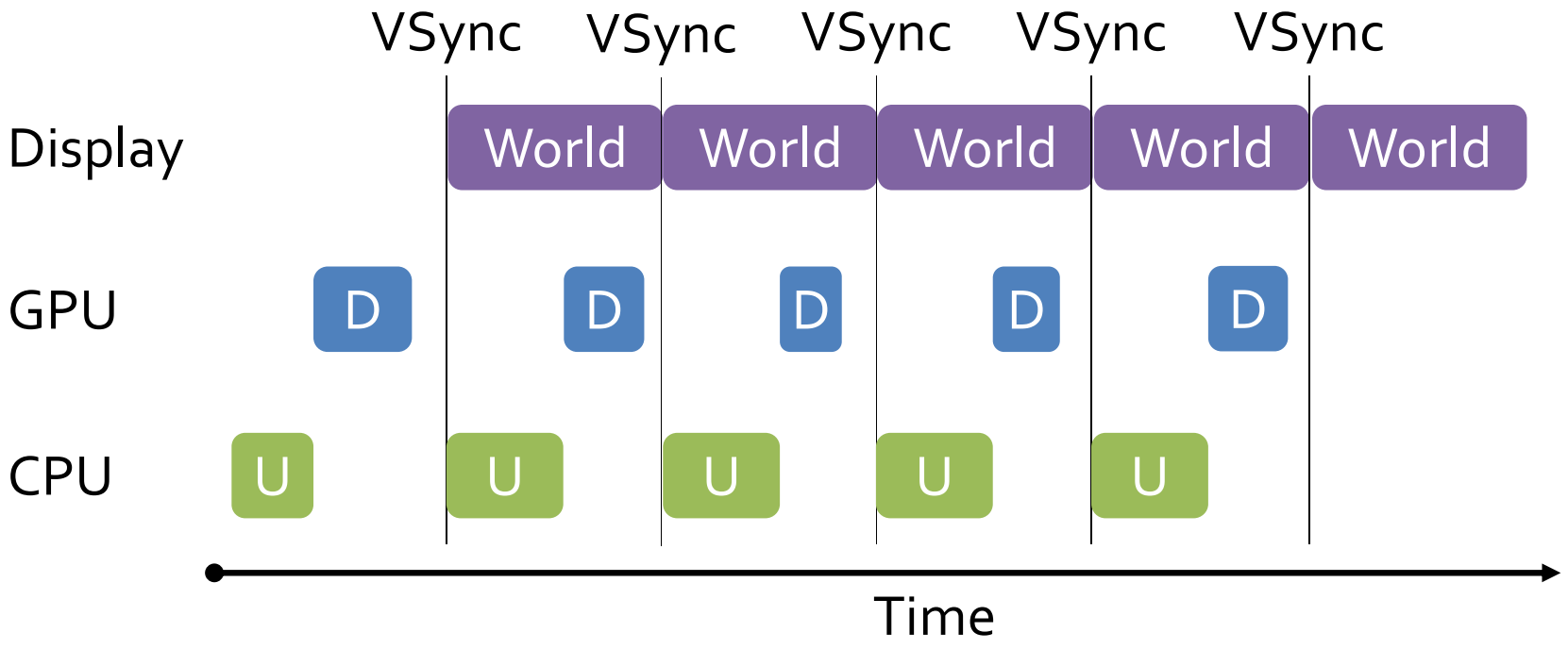
Vertical Synchronisation (VSync)



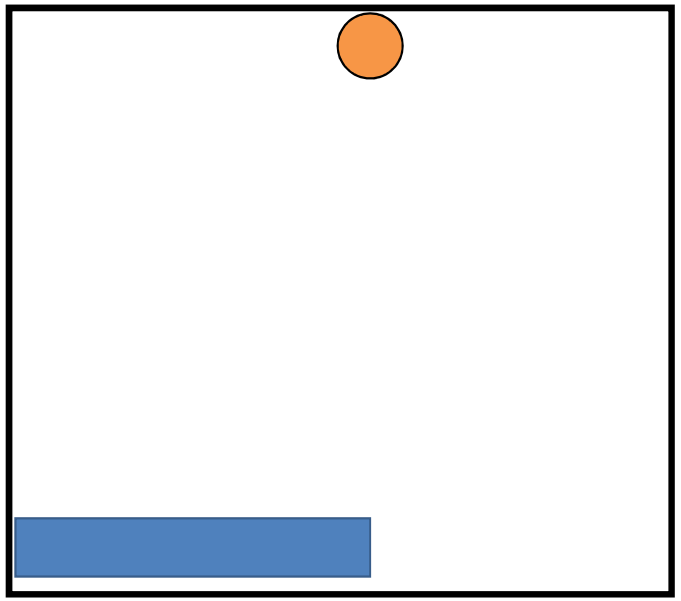
No Vsync – Screen Tearing



Vertical Synchronisation (VSync)



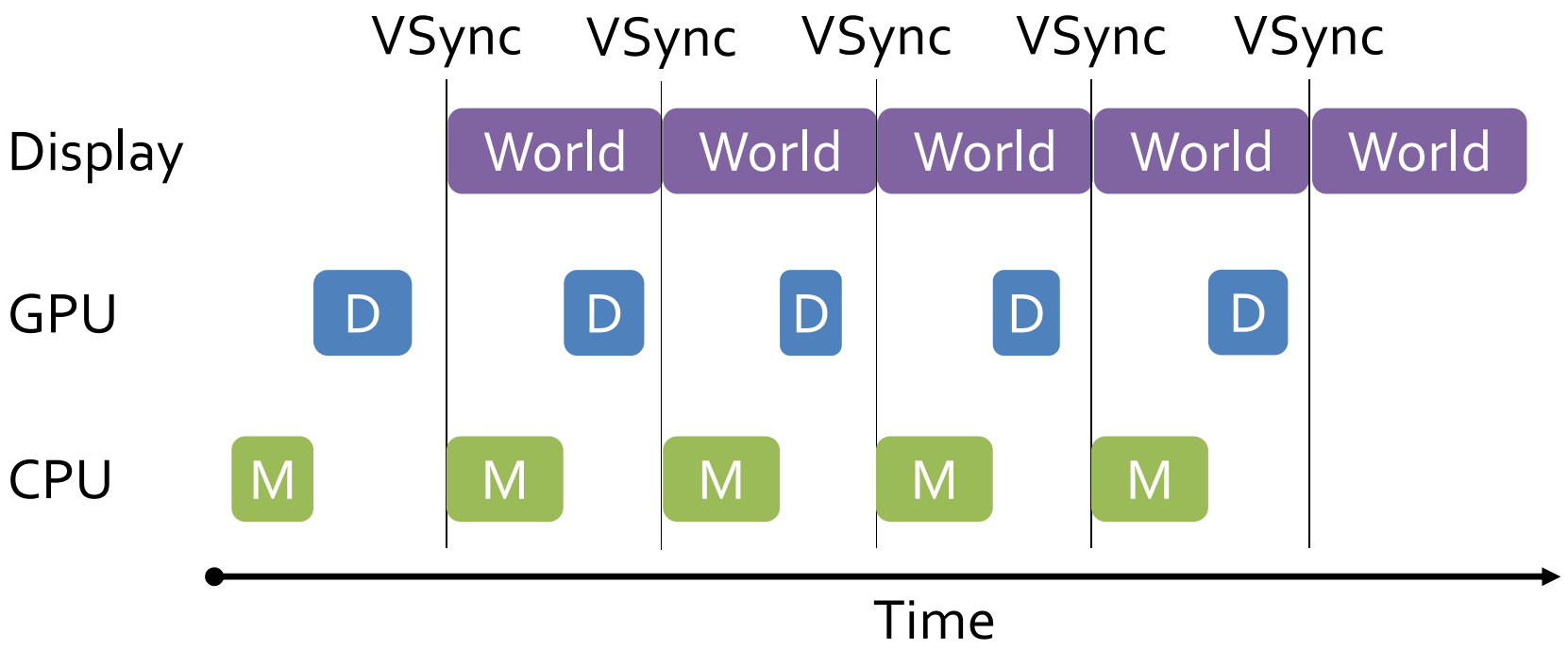
Animation – Idea?



- Move animated objects each frame a bit

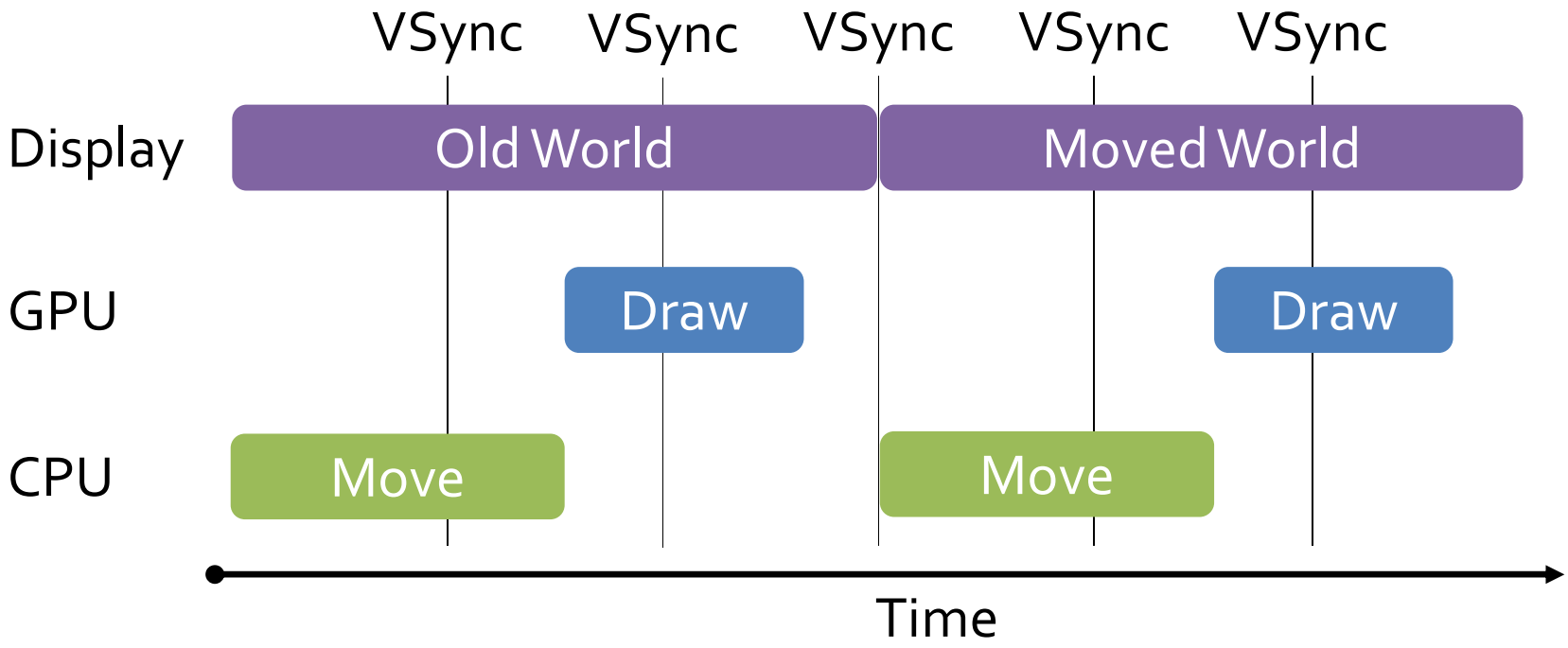
```
y = 1;
while(not finished)
{
    …
    y -= 0.1;
    DrawBall(y);
    …
}
```

Animation – Movement in Update



Speed Cheating

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



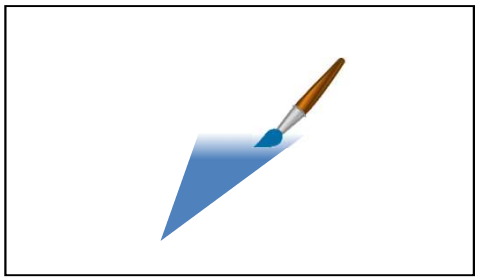
Frame Rate Independent Animation

- Animation speed **should not** change with PC speed
- Idea: use system time to scale all movements
- Each frame the time one frame takes is used to scale all movements

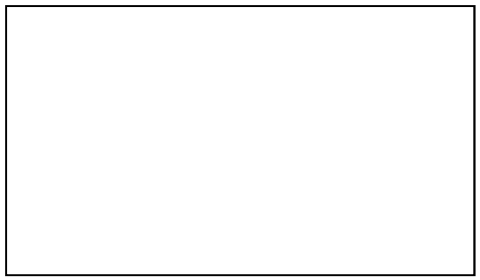
```
y = 1;
while(not finished)
{
  …
  t = GetTime();
  tFrame = t – tLast;
  tLast = t;
  y -= tFrame * 0.1;
  DrawBall(y);
  …
}
```

Double Buffering

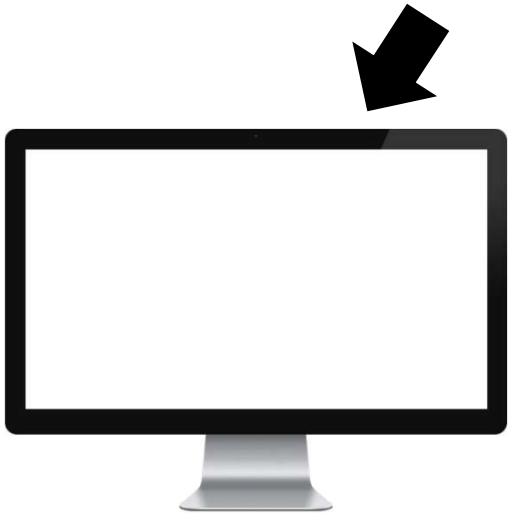
Double Buffering (2 Frame Buffer)



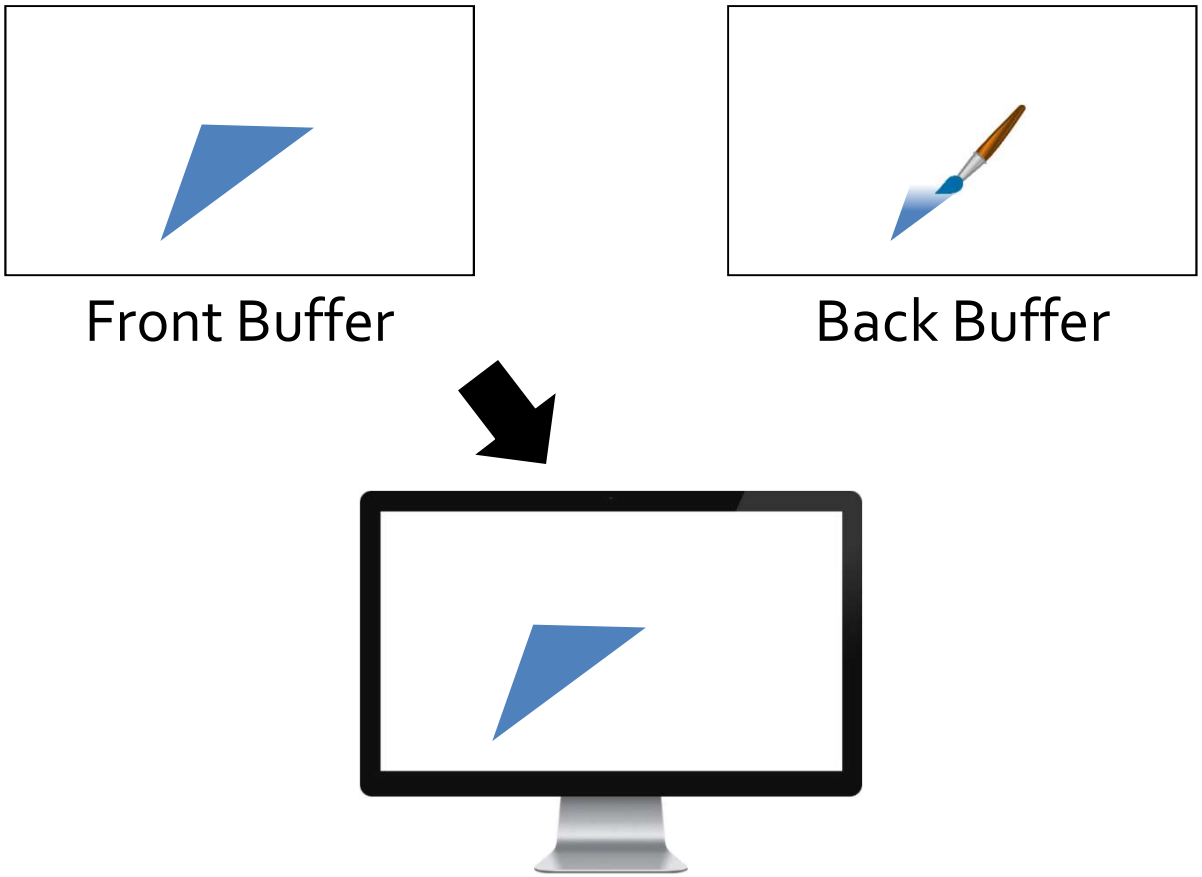
Back Buffer



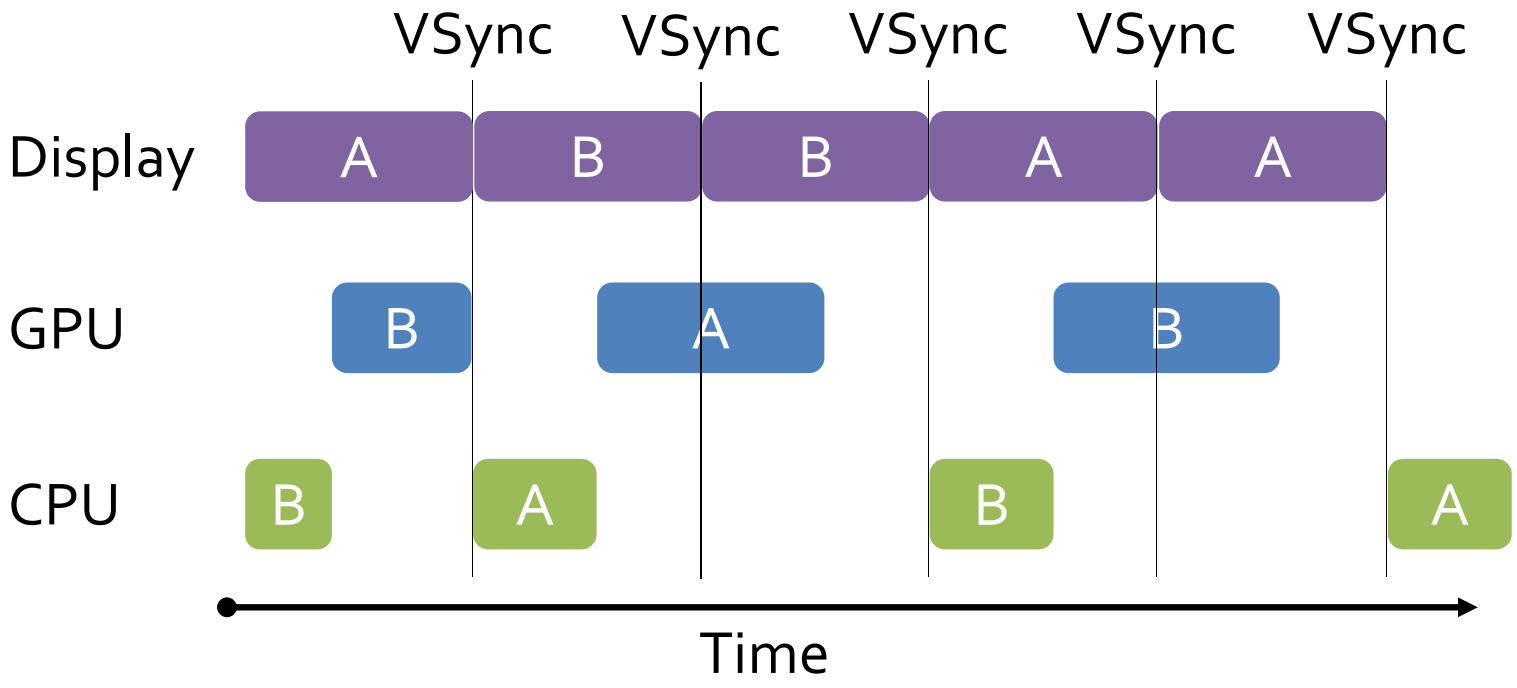
Front Buffer



Double Buffering



Vertical Synchronisation (VSync)



Tripple Buffering