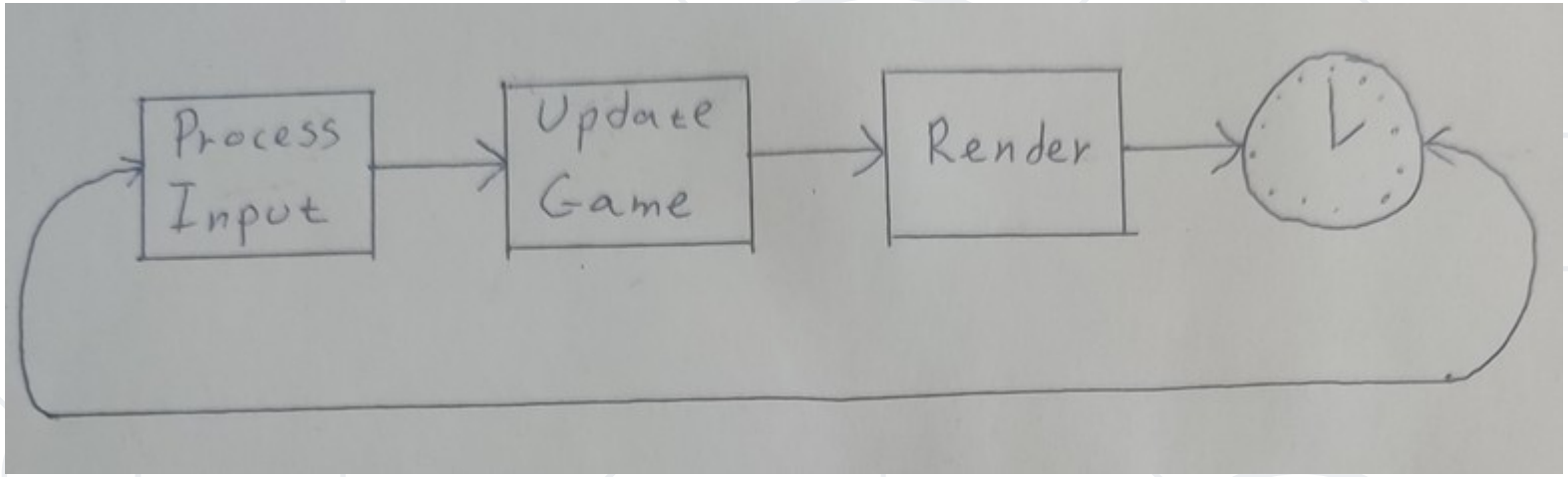
The Main Loop



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Have a Question?

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#app-dev-cpp

Crunching CPU tasks

- Imagine a program, which task is to process string commands

```
while (true) {
  char *command = readCommand();
  handleCommand(command);
}
```

- Pretty straight-forward
- Only problem is the user **can not interact** with the program

Event Loops

- Any graphical application (being a game or not) is designed to handle user requests

```
while (true) {
   Event *event = waitForEvent();
   dispatchEvent(event);
}
```

- Main difference is that program no longer executes only string command
- It is **waiting** for a **user input** – mouse click, keyboard click, touch screen press, etc ...
- The problem is that **nothing is displayed**
- The user can't tell what is happening

Event Loops

- Imagine the context of games
- Your character is sitting still

```
while (true) {
  Event *event = waitForEvent();
  dispatchEvent(event);
}
```

- Now imagine there is a monster hitting you since you are AFK
- Something should happen – your health should deteriorate
- This means **we can't block** on the "waitForEvent()"

Game Loops

- What needs to be done?

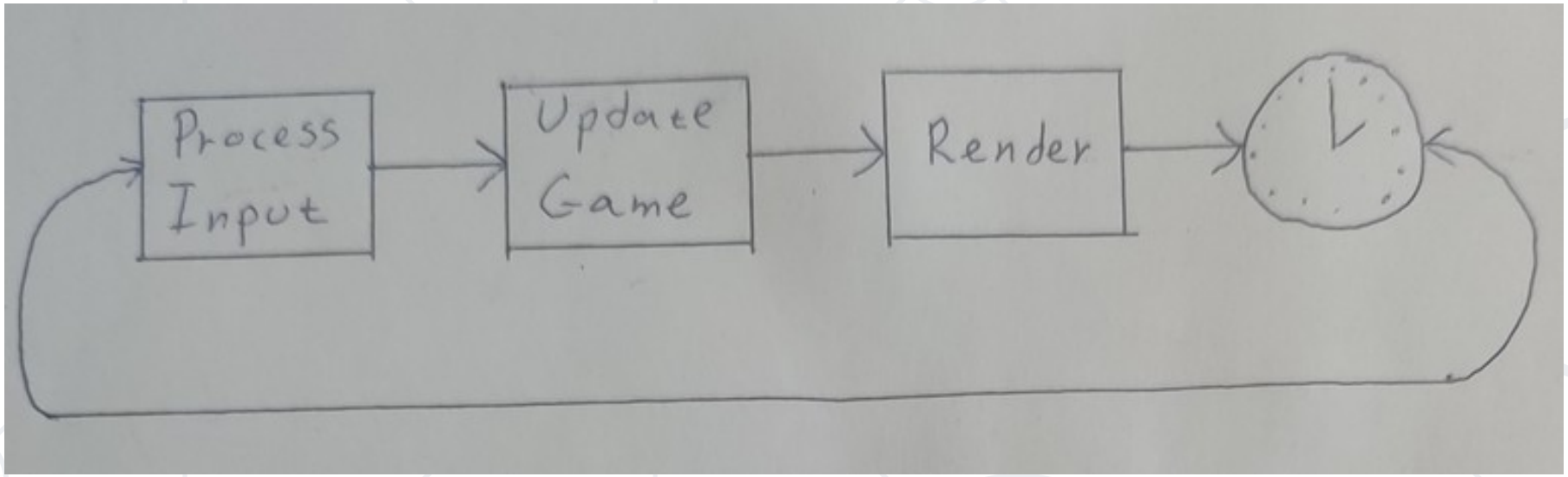
```
while (true) {
  handleInput();
  update();
  render();

  //sleep
}
```

1 spin = 1 frame

- This loop is running as fast as possible
- Your CPU/GPU will be at 100% and the game will run with XXX Frames Per Second (FPS)
- FPS = 1s / time for one frame

The Main Loop



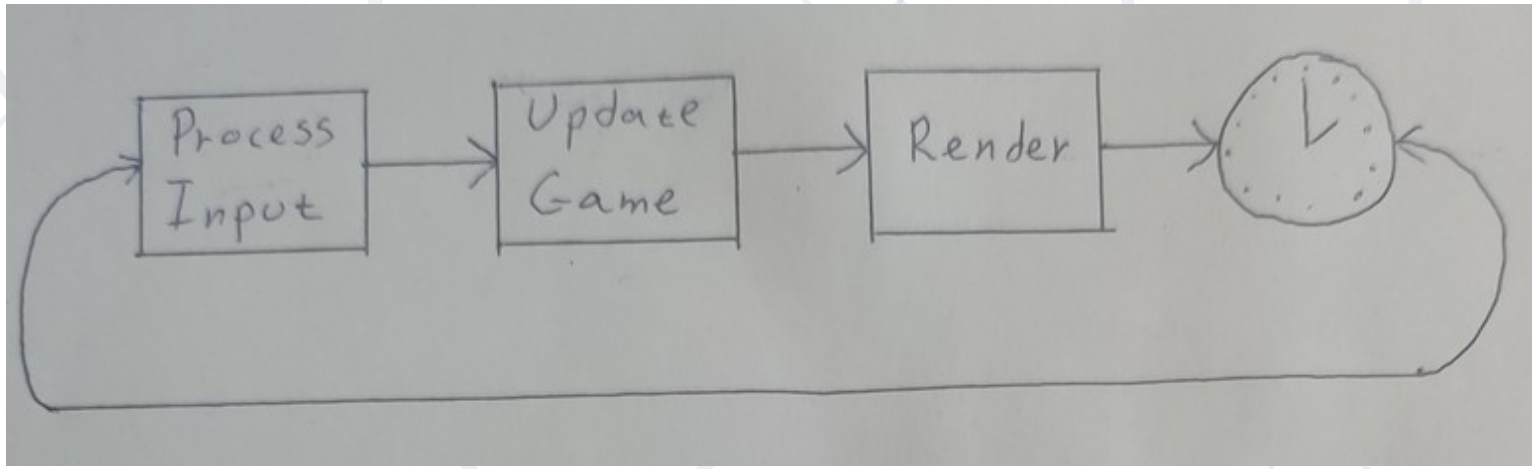

```
while (true) {
   handleInput();
   update();
   render();

   //sleep
}
```

How much to sleep depends on what FPS are you aiming for

The Main Loop

- The problem in this approach is the **update** method
- A render call could be **expensive** (taking a lot of time)
- There might be multiple events/updates happening in the meantime
- This results to "**lag**"

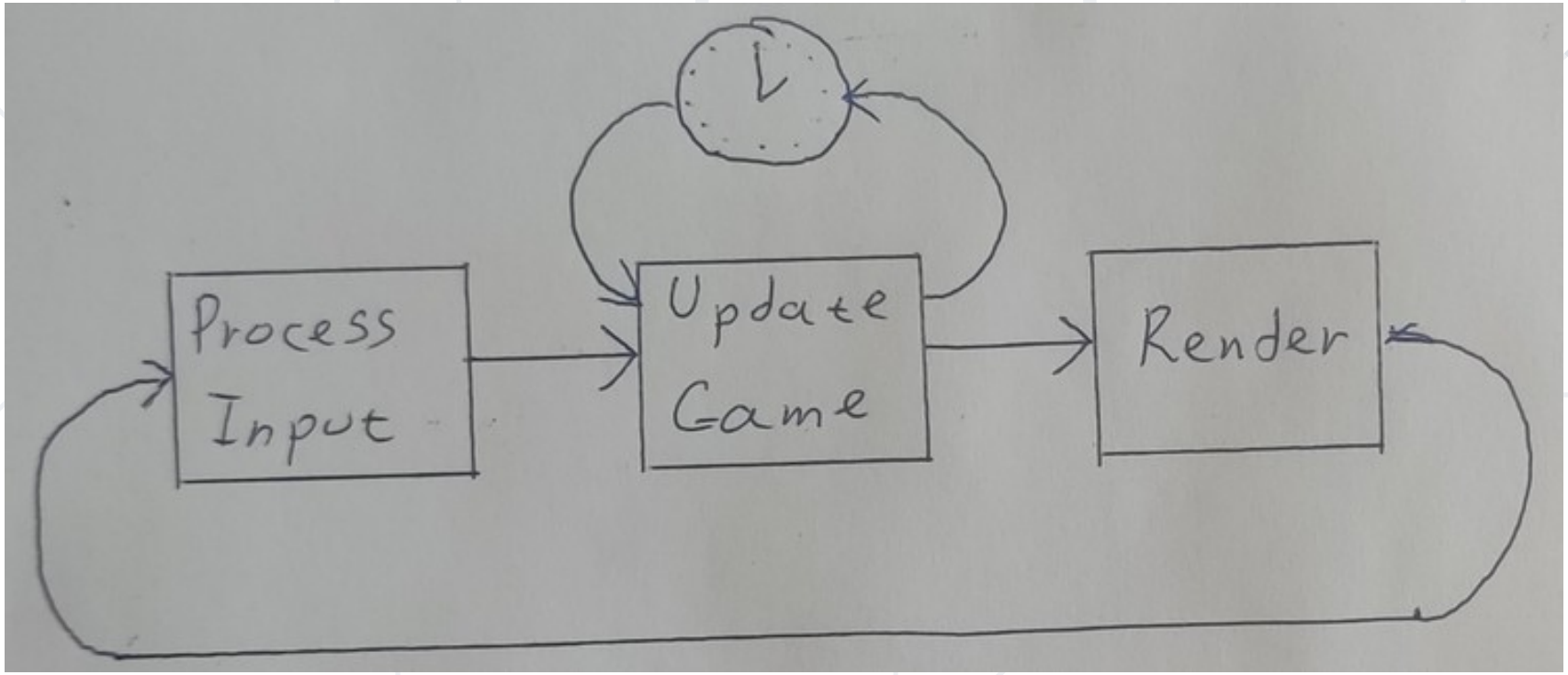



```
while (true) {
   handleInput();
   update();
   render();

   //sleep
}
```

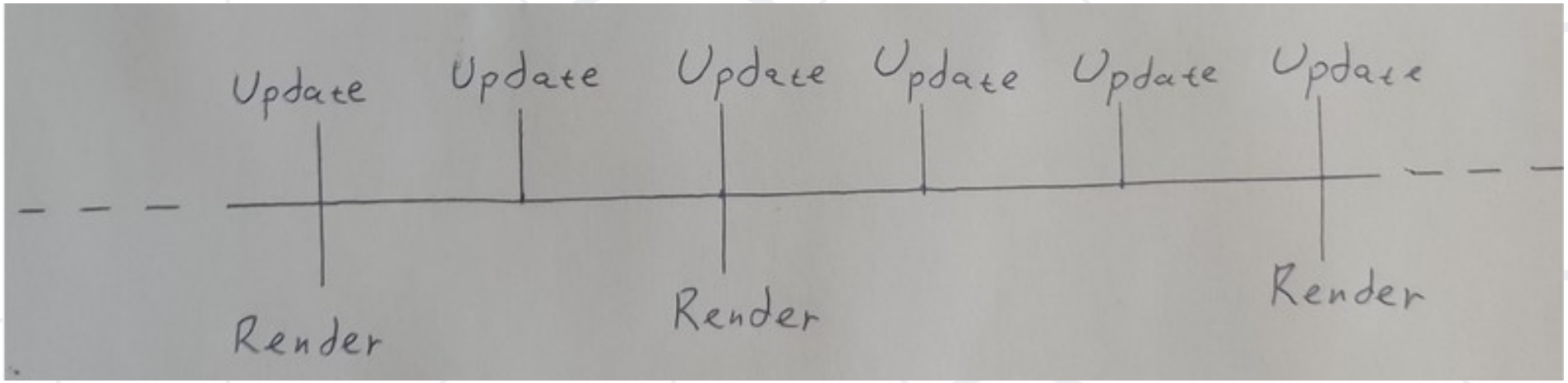
The Main Loop

- In order to fix the issue – **all available updates** should be made in **the same frame** before rendering



The Main Loop

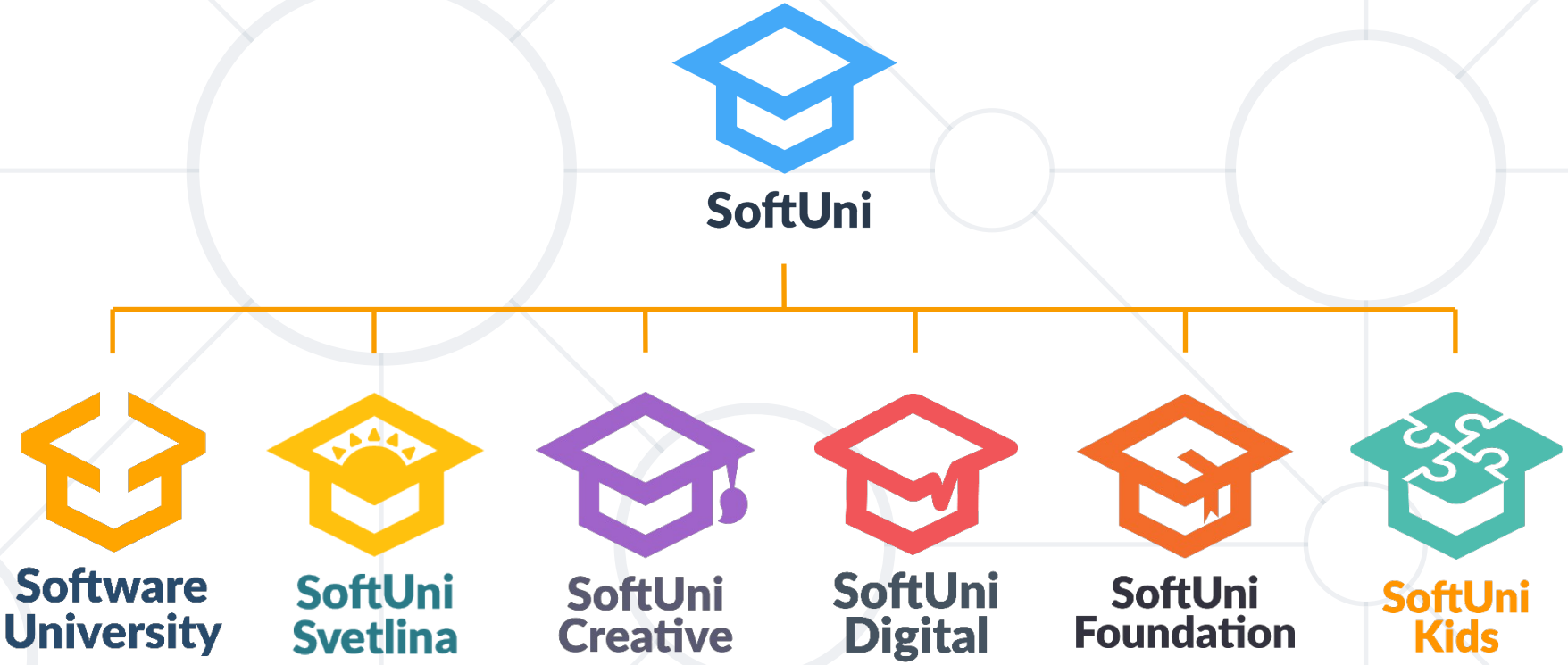
- The timeline of the main loop should look like this




```
while (true) {
   handleInput();
   update();
   render();

   //sleep
}
```

Questions?



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