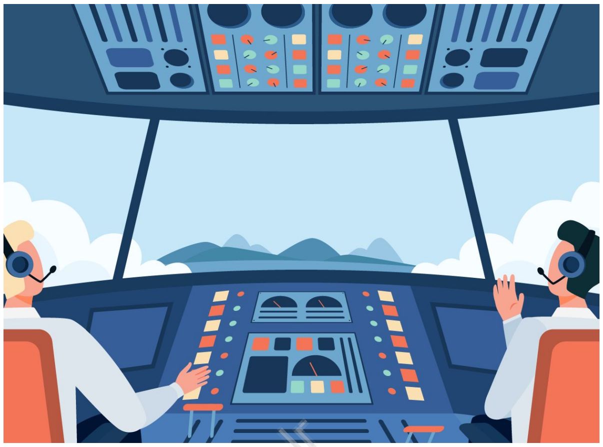
FLIGHT SIMULATION & CONTROLS



What is our GOAL for this MODULE?

The goal of this module is to create a flight simulation scene with keyboard controls.

What did we ACHIEVE in the class TODAY?

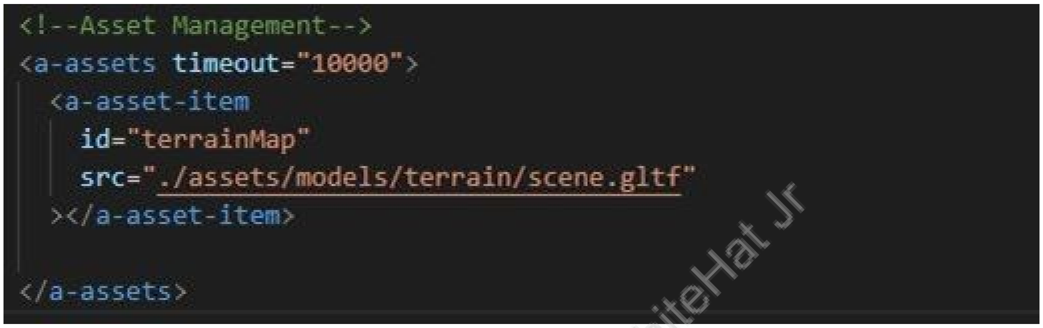
- We learned how to create a flight simulation scene.
- We also learned how to implement keyboard events to control the flight.

Which CONCEPTS/CODING BLOCKS did we cover today?

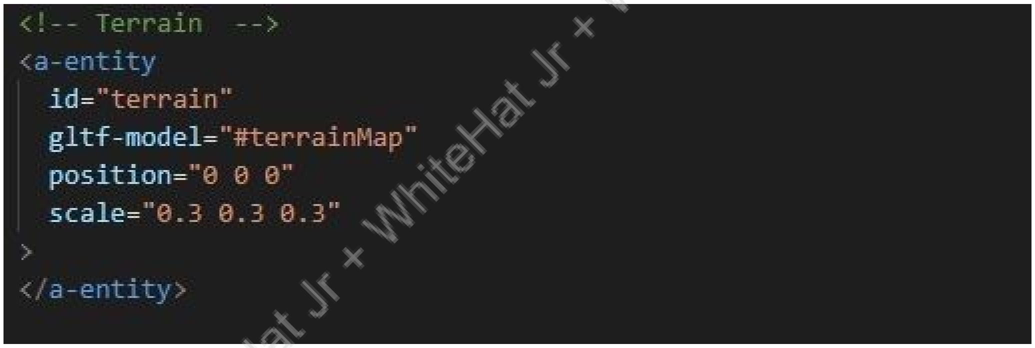
- Used AFRAME.registerComponent (name, definition)
- window.addEventListener()

How did we DO the activities?

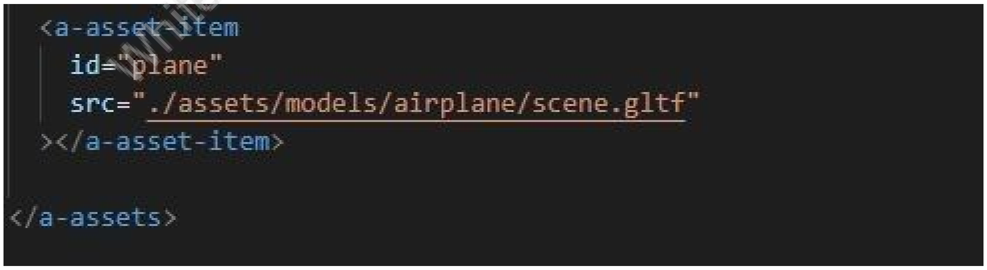
1. We learned how to load the models in AFrame scene



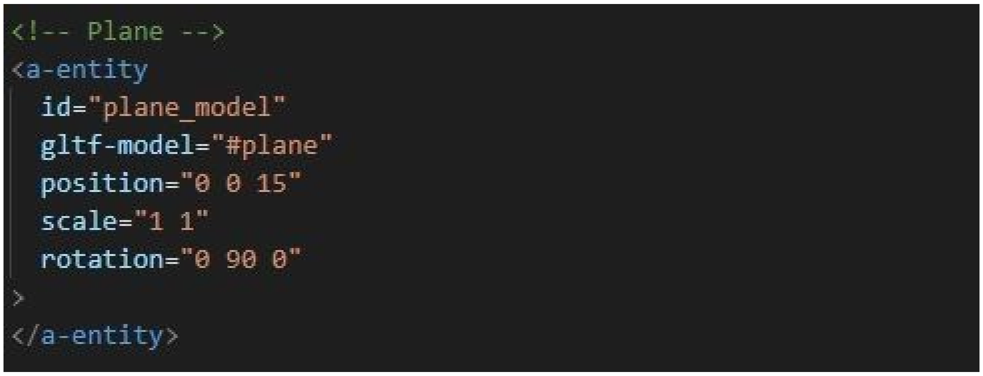
```
<!--Asset Management-->
<a-assets timeout="10000">
  <a-asset-item
    id="terrainMap"
    src="./assets/models/terrain/scene.gltf"
  ></a-asset-item>

</a-assets>
```



```
<!-- Terrain  -->
<a-entity
  id="terrain"
  gltf-model="#terrainMap"
  position="0 0 0"
  scale="0.3 0.3 0.3"
>
</a-entity>
```

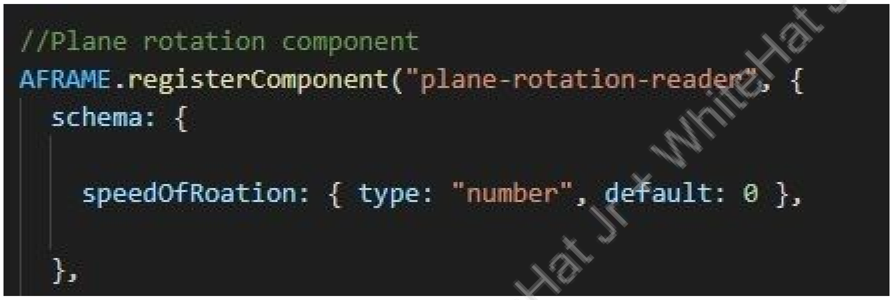


```
  <a-asset-item
    id="plane"
    src="./assets/models/airplane/scene.gltf"
  ></a-asset-item>

</a-assets>
```



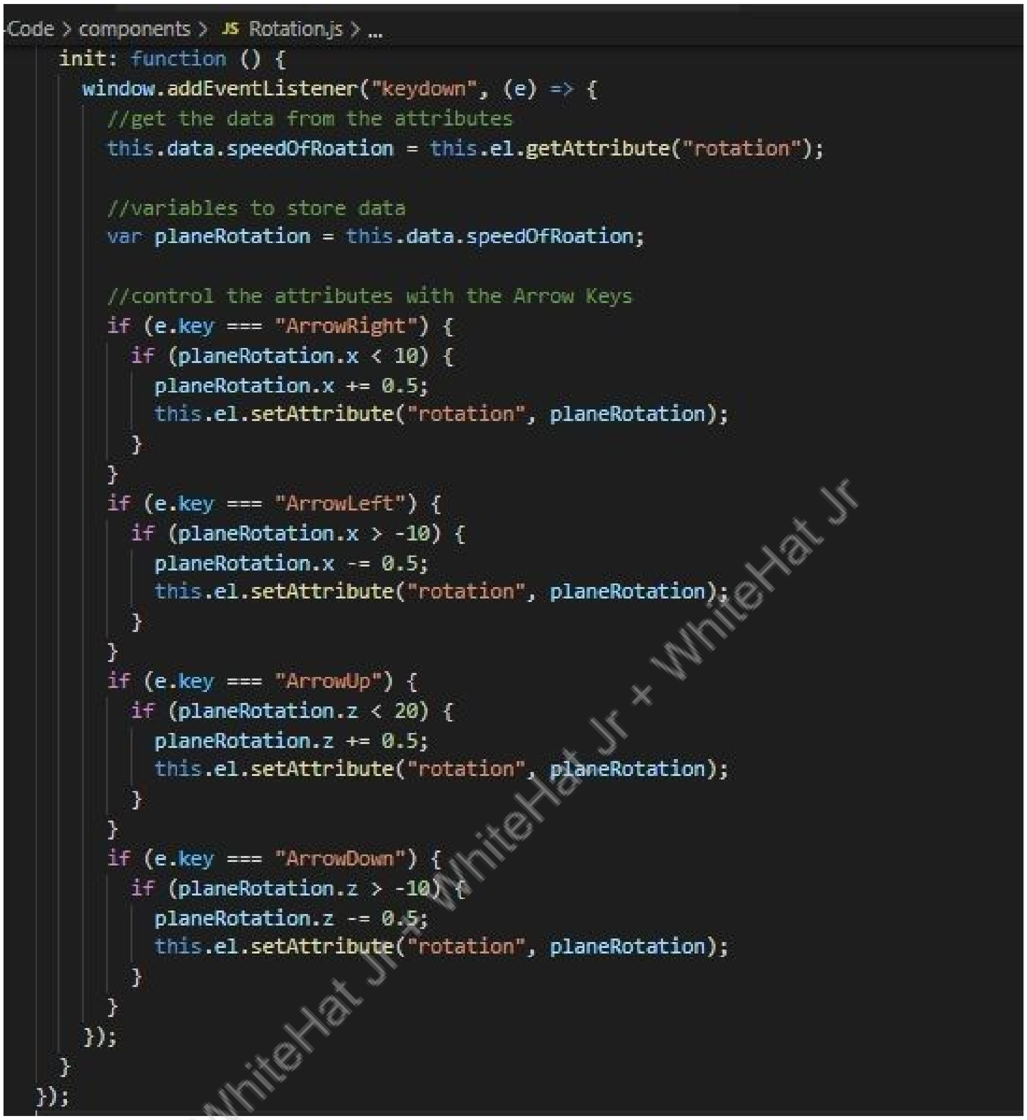
```
<!-- Plane -->
<a-entity
  id="plane_model"
  gltf-model="#plane"
  position="0 0 15"
  scale="1 1"
  rotation="0 90 0"
>
</a-entity>
```

2. We learned how to write the component to control flight movements



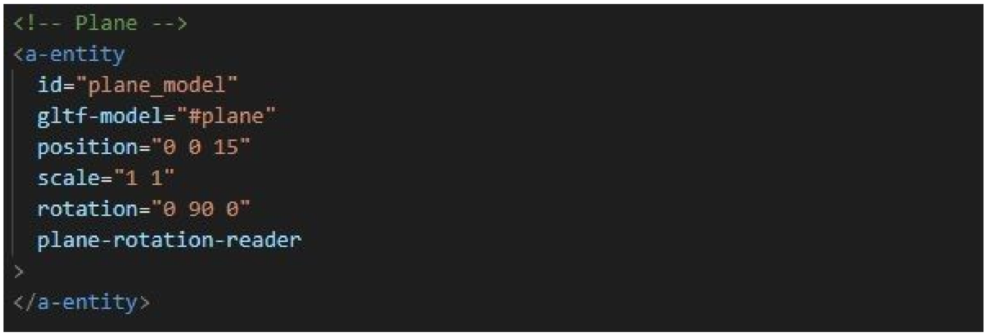
```
//Plane rotation component
AFRAME.registerComponent("plane-rotation-reader", {
  schema: {

    speedOfRoation: { type: "number", default: 0 },

  },
```

3. We learned how to write the code for the keydown event listener to rotate the flight



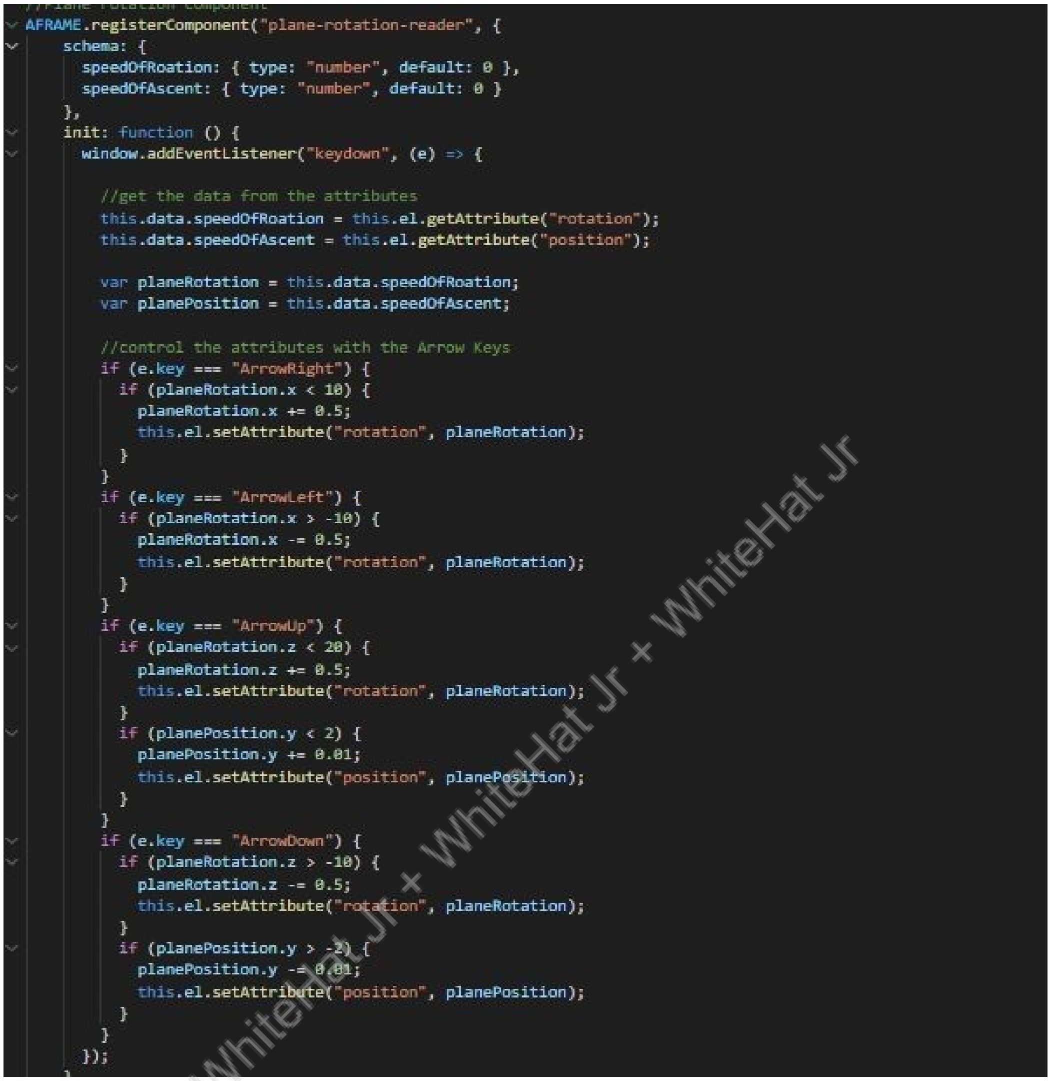
```
Code > components > JS Rotation.js > ...
    init: function () {
      window.addEventListener("keydown", (e) => {
        //get the data from the attributes
        this.data.speedOfRoation = this.el.getAttribute("rotation");

        //variables to store data
        var planeRotation = this.data.speedOfRoation;

        //control the attributes with the Arrow Keys
        if (e.key === "ArrowRight") {
          if (planeRotation.x < 10) {
            planeRotation.x += 0.5;
            this.el.setAttribute("rotation", planeRotation);
          }
        }
        if (e.key === "ArrowLeft") {
          if (planeRotation.x > -10) {
            planeRotation.x -= 0.5;
            this.el.setAttribute("rotation", planeRotation);
          }
        }
        if (e.key === "ArrowUp") {
          if (planeRotation.z < 20) {
            planeRotation.z += 0.5;
            this.el.setAttribute("rotation", planeRotation);
          }
        }
        if (e.key === "ArrowDown") {
          if (planeRotation.z > -10) {
            planeRotation.z -= 0.5;
            this.el.setAttribute("rotation", planeRotation);
          }
        }
      });
    }
  });
```

4. We learned how to attach the component to the entity.



```
<!-- Plane -->
<a-entity
  id="plane_model"
  gltf-model="#plane"
  position="0 0 15"
  scale="1 1"
  rotation="0 90 0"
  plane-rotation-reader
>
</a-entity>
```

5. We learned how to update the position attribute to move the flight up and down



```
//Plane rotation component
AFRAME.registerComponent("plane-rotation-reader", {
    schema: {
      speedOfRoation: { type: "number", default: 0 },
      speedOfAscent: { type: "number", default: 0 }
    },
    init: function () {
      window.addEventListener("keydown", (e) => {

        //get the data from the attributes
        this.data.speedOfRoation = this.el.getAttribute("rotation");
        this.data.speedOfAscent = this.el.getAttribute("position");

        var planeRotation = this.data.speedOfRoation;
        var planePosition = this.data.speedOfAscent;

        //control the attributes with the Arrow Keys
        if (e.key === "ArrowRight") {
          if (planeRotation.x < 10) {
            planeRotation.x += 0.5;
            this.el.setAttribute("rotation", planeRotation);
          }
        }
        if (e.key === "ArrowLeft") {
          if (planeRotation.x > -10) {
            planeRotation.x -= 0.5;
            this.el.setAttribute("rotation", planeRotation);
          }
        }
        if (e.key === "ArrowUp") {
          if (planeRotation.z < 20) {
            planeRotation.z += 0.5;
            this.el.setAttribute("rotation", planeRotation);
          }
          if (planePosition.y < 2) {
            planePosition.y += 0.01;
            this.el.setAttribute("position", planePosition);
          }
        }
        if (e.key === "ArrowDown") {
          if (planeRotation.z > -10) {
            planeRotation.z -= 0.5;
            this.el.setAttribute("rotation", planeRotation);
          }
          if (planePosition.y > -2) {
            planePosition.y -= 0.01;
            this.el.setAttribute("position", planePosition);
          }
        }
      });
```

We have successfully created a flight control simulation.

What’s NEXT?

In the next class, we will learn to create elements to add obstacles in the flight simulation scene.

EXTEND YOUR KNOWLEDGE:

1. Explore more about A-Frame: https://aframe.io/docs/1.1.0/introduction