Script 03

- Grouping geometric primitives into 3D models.
- Instantiating models and setting position, size and orientation.
- Applying local transformations and global transformations to models.
- Simple animation.

3.1 Grouping geometric primitives into 3D models

Open the file **threejs_ex_03_01_models.html**

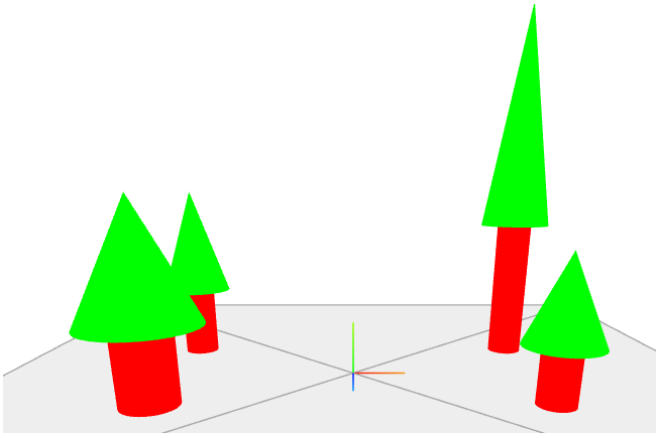
Questions:

- Which **models** make up the scene?
- What are **helper primitives** useful for?

Analyze the **createTree()** function:

- Which primitives are instantiated?
- How are they grouped into a composite model?
- Notice the appropriate positioning that needs to be done.

Tasks:



- Add **more trees** to the scene --- assign **different sizes** to them.
- Add **arguments** to the **createTree()** function, to facilitate tree **placement** and **scaling**.
- Add **illumination** and **shadows** to the scene --- see your code from last week.

3.2 Simple animation --- Displacement

In a similar way to last week, it is possible to **animate** the **movement** of each tree **along a straight line**.

Task:

- Add **simple linear movements** to each one of the scene trees --- see your code from last week.

3.3 Animation --- Rotation around a central axis

A model or a set of models can be rotated around a central axis. This can be accomplished by:

- Adding an **abstract node** to the scene graph that is the **parent** of the models we want to rotate.

- Afterwards, carrying out **transformations** relative to the coordinate frame of that abstract node, applies those transformations to its **child nodes**.

Tasks:

- Add **three trees** to the scene.

- Assign **different rotation movements** to them, so that they rotate around the scene's central axis with different speeds and directions, but do not collide with each other.

Additional Tasks:

- Implement a **createForest()** function, that creates a forest made up of three trees. It must be possible to **rotate the trees around the central axis of the forest**.

- Create a scene with **four forests**, each **rotating around its central axis** and all of them **rotating around the central axis of the scene**.

3.4 Extra

- Create a **car model**, using a **box primitive** and four **cylinder primitives**.

- Create a **robot model** using a **box primitive** for the body, a **sphere primitive** for the head and four **cylinder primitives** for the arms and legs.

- Add **several** of those **models** to a scene – assign different positions, orientations and sizes to them.

- Add some **animation** to the **models** and to the **camera.**