SPACES EDU

TypeScript cheat sheet

PRO

```ts
let myColor = new Color(100, 0, 0);
// Defines a color with RGB values (100, 0, 0)

Debug.log(`The defined color is: ${myColor}`);
// Logs the defined color
```

```ts
let item1 = Scene.getItem("item1ID");
let item2 = Scene.getItem("item2ID");

Physics.physicsSpeed = 10;  // Sets the overall physics speed to 10

item2.physics.enabled = true;
item1.physics.enabled = true;

const distance = item1.center.sub(item2.center);
// Subtracts item2's position from item1's position to calculate the direction

item2.physics.applyImpulseLocal(Vector3.zero, distance);
// Pushes item2 towards item1 by applying an impulse in the direction of the distance
```

```ts
item.transform.rotate(Vector3.zero, new Vector3(0, 1, 0), -1);
// Rotates the object around its origin point
// along the Y-axis by -1 radian (clockwise)
```

```ts
let item1 = Scene.getItem("Item1");
let item1_slot = item1.getSlot('Top');

let item2 = Scene.getItem("Item2");
let item2_slot = item2.getSlot('Bottom');

item2_slot.attachTo(item1_slot);
// Attaches item2 to item1 using their respective slots
```

Last updated: October 2024

TypeScript code simply described and represented

```ts
const item = Scene.getItem("itemID") as AnimatedItem;

item.animation.play("Dance fun");
// Plays the animation named 'Dance fun'
```

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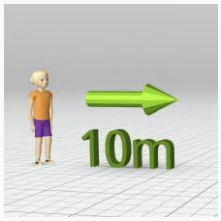
Transform

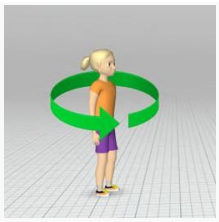
Transitions

BASIC



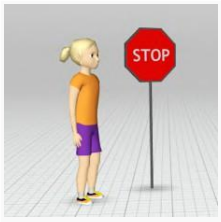
Make an object **move a certain distance** in a certain degrees on the z-axis in 1

```
const item = Scene.getItem("myItem");

item.transition.moveBy(new Vector3(10, 0, 0), 2);
// Moves the item by 10 meters along the X-axis over 2 seconds
```



Make an object or a character **turn** over time

```
const item = Scene.getItem("myItem");

item.transition.rotateLocal(new Vector3(0, 0, 1), 3, 1);
// Rotates the item locally around the Z-axis by 3 degrees over 1 second
```



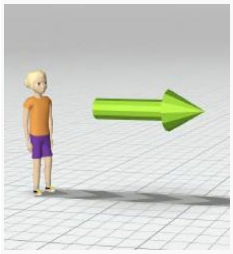
Stop an object or a character

```
const item = Scene.getItem("myItem");
item.transition.stop();  // Stops the object's current movement or transition
```

PRO

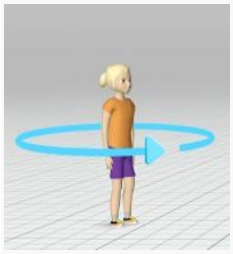
Make an object **move to a certain point** over time

```
const item = Scene.getItem("myItem");

item.transition.moveTo(new Vector3(5, 10, 3), 3);
// Moves the object to position (5, 10, 3) over 3 seconds
```



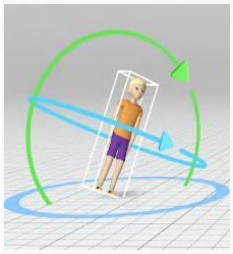
Make an object **move on a path** over time

```
const myItem = Scene.getItem("myItem");
const myPath = Scene.getItem("myPath") as PathItem;

myItem.transition.moveOnPath({
    path: myPath,
    speed: 1.5,
    turnWithPath: true,
    repeat: true
});
// Moves the item along the path with a speed of 1.5, following the path indefinitely
```



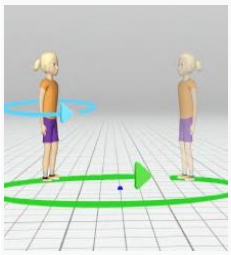
Make an object **turn of a certain angle**

```
const item = Scene.getItem("objectID");

item.transform.rotate(Vector3.zero, new Vector3(0, 0, 1), Math.PI);
// Rotates the object around its origin point
// along the Z-axis by 180 degrees (Math.PI radians)
```



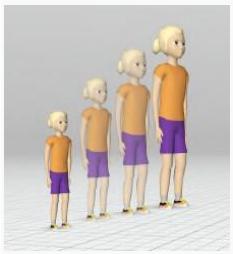
Make an object **turn around an axis**

```
item.transform.rotate(Vector3.zero, new Vector3(0, 1, 0), -1);
// Rotates the object around its origin point
// along the Y-axis by -1 radian (clockwise)
```



Make an object **turn relative to a point** in a certain direction

```
const item = Scene.getItem("ObjectID");

item.transform.rotateLocal(new Vector3(0, 2, 0), new Vector3(0, 0, 1), -180);
// Rotates the object with an offset of (0, 2, 0) along the Z-axis by -180 degrees
```

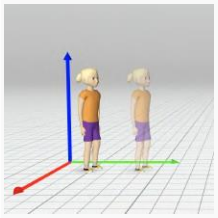


Change the **size** of an object over time

```
const item = Scene.getItem("objectID");

Time.scheduleRepeating(() => {
    item.transform.multScale(1.2);
}, 1);
// Increases the size of the item by 20% each second
```

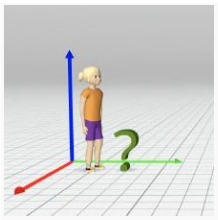
Position

PRO



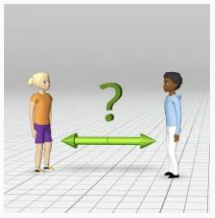
Change the **position** of an object

```
const item = Scene.getItem("myItem");

item.transform.position = new Vector3(0, 0, 0);
// Sets the object's position to (0, 0, 0)
```



Get the **position** of an object

```
const item = Scene.getItem("objectID");

Debug.log(`Item's position is: ${item.transform.position}`);
// Logs the position of the item to the Debug console
```

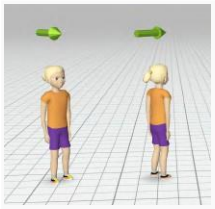


Get the **distance** between 2 objects

```
const item1 = Scene.getItem("item1ID");
const item2 = Scene.getItem("item2ID");

let distance = item1.center.dist(item2.center);
Debug.log("The distance between the items is " + distance);
// Calculates and logs the distance between item1 and item2
```

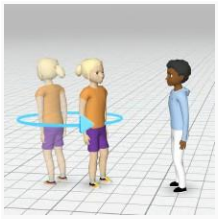
Rotation

PRO



Change the **direction** of an object

```
const item = Scene.getItem("objectID");
let newDirection = new Vector3(0, -1, 0);

item.transform.setDirection(newDirection);
// Sets the object's direction to (0, -1, 0) along the Y-axis
```

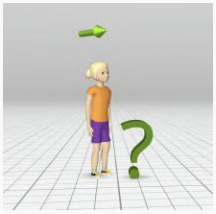


Make an object **turn towards another object**

```
const item1 = Scene.getItem("item1ID");
const item2 = Scene.getItem("item2ID");

item1.transform.lookAt(item2.transform.position);
// Makes item1 rotate to face item2's position
```

Make an object **turn towards certain position**

```
const item = Scene.getItem("itemID");

item.transform.lookAt(new Vector3(0, 0, 0));
// Makes the item rotate to face the point (0, 0, 0)
```



Get the **direction** of an object

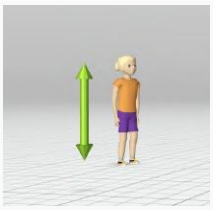
```
const item = Scene.getItem("itemID");
let originalDirection = item.transform.axisY;

Debug.log("Item direction is " + originalDirection);
// Open the console debugger </> to see the object's Y-axis direction
```

Scale

PRO

Set the **size** of an object

```
const object = Scene.getItem("ObjectID");

object.transform.scale = 0.5;
// Scales the object down to 50% of its original size
```



Get the **size** of an object

```
let item = Scene.getItem("itemID");

Debug.log(`Item's size is: ${item.transform.scale}`);
// Logs the current scale (size) of the item to the Debug console
```

Actions

Generic

BASIC

Make a character **say** or **think** something

```
const character = Scene.getItem("myCharacter");
character.speech = "Hi!";  // Character says "Hi!"

character.thought = "Hmm";  // Character thinks "Hmm"
```

Change the **color** of an item

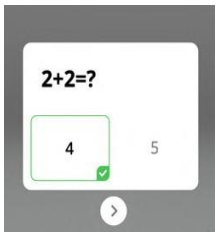
```
const item = Scene.getItem("objectID");

item.color = Color.blue;
// Changes the item's color to blue
```

Change the **opacity** of an item

```
const item = Scene.getItem("myItem");
item.opacity = 0.5;  // Sets the opacity of the item to 50%
```

Show an **info panel** with a title, text (and an image)

```
GUI.HUD.showInfoPanel({
    title: "Title",
    text: "Text",
    image: "imageUrl"  // Optional: Add image URL or leave it out for no image
});
```



Show a **quiz panel** with a question and answers that can be clicked and will trigger an action when the selected answer is correct or incorrect.

```
GUI.HUD.showQuizPanel({
    question: 'Your question here',
    answer1: 'Answer 1',
    answer2: 'Answer 2',
    answer3: 'Answer 3',
    answer4: 'Answer 4',
    correctAnswer: 1,  // Change to the correct answer number
    onCorrect: () => {
        // Action to perform on correct answer
    },
    onWrong: () => {
        // Action to perform on wrong answer
    }
});
```

Show a **choice panel** with a question and options that can be clicked and that trigger different actions.

```
let choice = 0;
GUI.HUD.showChoicePanel({
    question: 'This is your question.',
    answer1: 'First answer.',
    answer2: 'Second answer.',
    onAnswer: answer => {
        choice = answer;
        if (choice === 1) {
            // Action for Option1
        }
        else if (choice === 2) {
            // Action for Option2
        }
    }
});
```

PRO

Play or stop the **animation** of an object

```
const item = Scene.getItem("itemID") as AnimatedItem;

item.animation.play("None");
// Plays the animation named 'None'
```

Make an object **say** something for a certain duration

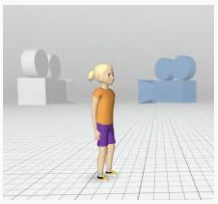
```
function timedSpeech(char, sentence: string, duration: number) {
    char.speech = sentence;
    Time.schedule(() => {
        char.speech = null;
    }, duration);
}

timedSpeech(item, "Hi", 2);
// Makes the item say "Hi" for 2 seconds
```

Make an object **think** something for a certain duration

```
function timedThought(char, sentence: string, duration: number) {
    char.thought = sentence;
    Time.schedule(() => {
        char.thought = null;
    }, duration);
}

timedThought(item, "Hmm", 2);
// Makes the item think "Hmm" for 2 seconds
```

Define the **text** of a text object

```
let textObject = Scene.getItem("objectID") as Text3DItem;

textObject.text = "my text";
// Sets the text of the 3D text object to "my text"
```

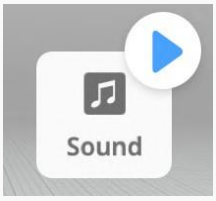


Switch to a different **camera** in your scene

```
let cam2 = Scene.getItem("cameraID") as CameraItem;

Camera.focusedItem = cam2;
// Defines the CameraItem that the client is currently looking through
```

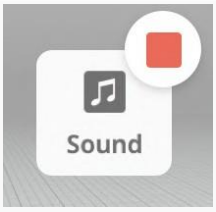
Sound

BASIC



Play a **sound** file

```
const music = Sound.load("soundID");
music.play();  // Play the sound
```

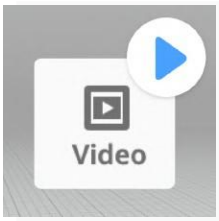


Stop playing the **sound** file

```
music.stop();  // Stop the sound
```

Video

PRO

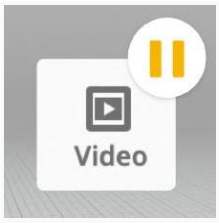


Start playing a video and choose to wait for the video to end or not before next actions

```
let item = Scene.getItem("clipID") as VideoItem;

item.video.play();
// Plays the video associated with the VideoItem
```

Stop playing a certain video

```
let item = Scene.getItem("clipID") as VideoItem;

item.video.stop();
// Stops the video associated with the VideoItem
```



Pause a certain video

```
let item = Scene.getItem("clipID") as VideoItem;

item.video.pause();
// Pauses the video associated with the VideoItem
```

Events

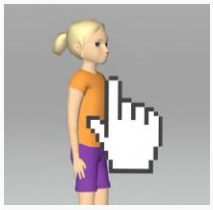
Input

BASIC

Make something happen **when** an item is **clicked**

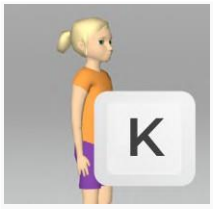
```
const item = Scene.getItem("myItem");

item.input.onClick(() => {
    // Action to perform when clicked on
});
// Executes the action when the item is clicked
```

PRO



Define what happens when a certain **object** is **hovered over**

```
const item = Scene.getItem("myItem");

item.input.onHover(() => {
    // Action to perform when hovered over
});
// Executes the action when the item is hovered over
```

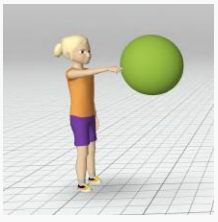


Define what happens when a certain **key** is **pressed**

```
Input.onKeyPressed(() => {
    // Action or function to perform
}, "k");
// Executes the action when the "k" key is pressed
```

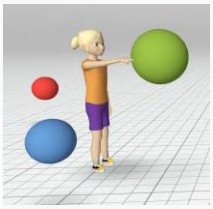
Collision

PRO



Define what happens when a certain **object collides with another object**

```
const item = Scene.getItem("itemID");

item.onCollisionEnter(() => {
    // Action or function to perform
});
// Executes the action when the item collides with another object
```

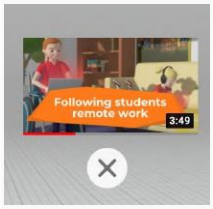


Define what happens when a certain **object collides with any other object** and no longer collides with it

```
const item = Scene.getItem("itemID");

item.onCollisionExit(() => {
    // Action or function to perform
});
// Executes the action when the item is no longer colliding with another object
```

Web

PRO



Show a YouTube video when the object is **clicked.**

Currently not supported in Typescript - only via Debugger (ctrl+click)

```
const item = Scene.getItem("itemID");

item.input.onClick(() => {
    Debug.log("Follow the link: https://youtu.be/15Vlqe22_x0?si=oyXvOYrqFYjihSjD");
});
// Logs a message with a YouTube video link in the debugger when the item is clicked
```

Open a website when the object is **clicked**

Currently not supported in Typescript - only via Debugger (ctrl+click)

```
const item = Scene.getItem("myItem");

item.input.onClick(() => {
    Debug.log("Follow the link: https://edu.cospaces.io");
});
// Logs the message with the link when the item is clicked
```

Removes existing **events** on an object (e.g. when this object is **clicked or hovered**)

```
const item = Scene.getItem("myItem");

item.input.onClick(() => {
    // Action to perform when clicked on

    item.input.onClick(null);
    // Disables further onClick events by setting the event handler to null
});
// Executes the action and disables further onClick events
```

```
const item = Scene.getItem("myItem");

item.input.onHover(() => {
    // Action to perform when hovered over

    item.input.onHover(null);
    // Disables further onHover events by setting the event handler to null
});
// Executes the action and disables further onHover events
```

Control

Loops

BASIC

Make one or more actions **repeat** a certain amount of times

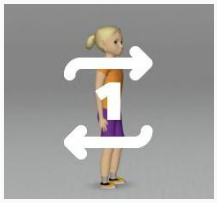
```
for (let i = 0; i < X; i++) {
    // Repeated action
}
```

Repeats the action **x** times

PRO

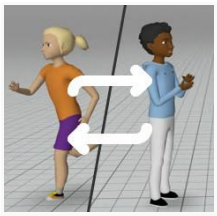
Make an action happen **forever** as a **loop**

```
Time.scheduleRepeating(() => {
    // Action or function to perform repeatedly
}, 1);
// Repeats forever, each second
```



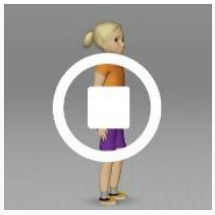
Make an action **repeat** as a loop for a **certain amount** of times. Use every repetition step as a **variable**.

```
let step = 1;

for (let i = 0; i < 100; i = i + step) {
    // Action or function to perform
}
// Repeats the action 100 times, increasing by 'step' each time
```



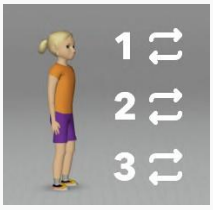
Make an action **repeat** as a loop **while** a condition is **true**

```
let condition = true;
if (condition = true) {
    // Action or function to perform
}
// Performs the action while 'condition' is true
```



Stop a loop from **repeating**

```
for (let i = 0; i < 10; i++) {
    if (i === 5) {
        break;  // Stops the loop when i equals 5
    }
    // Action or function to perform
}
```



Make an action **repeat for each entry** in a list

```
const item1 = Scene.getItem("item1ID");
const item2 = Scene.getItem("item2ID");
const item3 = Scene.getItem("item3ID");

let list = [item1, item2, item3];
list.forEach(element => {
    // Action or function to perform on each item
});
// Iterates through the list and performs the action on each item
```

If

PRO

Make an action **happen only if** a certain condition is true

```
if (1 < 2) {
    // Action or function to perform if 1 is less than 2
}
// Executes the action because 1 is less than 2
```

Make an action **happen only if** a certain condition is true. **Else**, make **another action** happen

```
if (1 < 2) {
    // Action or function to perform if 1 is less than 2
} else {
    // Action or function to perform if the condition is false
}
// If 1 is less than 2, the first action is executed, otherwise the second
```

Other

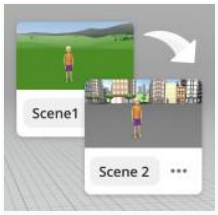
BASIC

Make my program **wait** for some time

```
Time.schedule(() => {
    // Perform action or function after 3 seconds
}, 3);
// Makes the program wait for 3 seconds
```

Go to specific scene

```
Space.goToScene(4);
// Switches to the scene with ID 4
```



Switch to a different **scene**

```
Application.onSceneSwitch(() => {
    // Action or function to perform
});
// Executes the action when the scene is switched
```

Quit the CoSpace and optionally show an image

```
Application.quit();
// Quit the CoSpace
```

Hide or show arrows to **switch scenes**

```
GUI.HUD.sceneNavigationVisible = false;
// Hide arrows to switch scenes
```

Operators

Logic

PRO

Enter an **arithmetic condition**

```
if (1 === 10) {
    // Action or function to perform if 1 equals 10
}
// This condition will evaluate as false since 1 does not equal 10
```

Enter a **logical condition**

```
if (1 < 2 && true) {
    // Action or function to perform if both conditions are true
}
// The action will be performed because both conditions are true
```

Check if something **isn't true**

```
if (!false) {
    // Action or function to perform if the condition is NOT true
}
// The action will be performed because 'false' is NOT true
```

Check if something is **true** and **return a certain value if it is or isn't**

```
let result = false ? 1 : 2;
// Returns 1 if true, otherwise returns 2

Debug.log(result);
// Logs the result
```

Math

PRO

Get a **random number** within a certain range

```
function getRandomInt(min: number, max: number): number {
    return Math.floor(Math.random() * (max - min + 1)) + min;
}

let randomNumber = getRandomInt(0, 100);
// Generates a random integer between 0 and 100
```

Get a **random integer number** within a certain range

```
function getRandomInt(min: number, max: number): number {
    return Math.floor(Math.random() * (max - min + 1)) + min;
}

let randomNumber = getRandomInt(0, 100);
// Generates a random integer between 0 and 100

let myNumber = randomNumber.toFixed(0);
// Formats the number with 0 digits after the decimal point
```

Enter an **arithmetic condition**

```
let result = 1 + 1;
// Adds 1 and 1, storing the result

Debug.log(result);
// Logs the result
```

Limit a number **within a certain range of numbers**

```
let x = 5;
function constrain(number: number, min: number, max: number): number {
    return Math.min(Math.max(number, min), max);
}

let constrainedValue = constrain(x, 1, 100);
// Constrains the value of x between 1 and 100

Debug.log(constrainedValue);
// Logs 5, since it's within the range
```

Check if a certain number is **even or odd**. Returns true for even, false for odd.

```
function isEven(number: number): boolean {
    return number % 2 === 0;
}

let result = isEven(3);
// Checks if 3 is even

Debug.log(result);
// Logs false because 3 is not even
```

Check if a certain number is **divisible by another number**. Returns true if it is.

```
function isDivisibleBy(number: number, divisor: number): boolean {
    return number % divisor === 0;
}

let result = isDivisibleBy(0, 3);
// Checks if 0 is divisible by 3

Debug.log(result);
// Logs true because 0 is divisible by any non-zero number
```

Get the **remainder of a division**

```
let remainder = 0 % 2;
// Gets the remainder of the division of 0 by 2

Debug.log(remainder);
// Logs 0 because 0 divided by 2 has no remainder
```

Get the **rounded value** of a certain number

```
let myNumber = randomNumber.toFixed(0);
// Formats the number with 0 digits after the decimal point
```

Gets the **rounded to 2 decimals value** of a certain number

```
let myNumber = 0;
let roundedNumber = myNumber.toFixed(2);
// Rounds the number to 2 decimal places

Debug.log(roundedNumber);
// Logs the rounded value
```

Get the **square root** of a certain number

```
let myNumber = 0;
let squareRoot = Math.sqrt(myNumber);
// Gets the square root of myNumber

Debug.log(`Square root is: ${squareRoot}`);
// Logs the square root value
```

Get the result of a **trigonometric operation**

```
let myNumber = 0;
let sineValue = Math.sin(myNumber);
// Gets the sine of myNumber (in radians)

Debug.log(`Sine of the number is: ${sineValue}`);
// Logs the sine value
```

Get the **sum** of a list of variables

```
let myVariable = [1, 2, 3, 4, 5];
let sum = myVariable.reduce((accumulator, currentValue) => accumulator + currentValue, 0)
// Sums all the values in the list

Debug.log(`The sum is: ${sum}`);
// Logs the sum of the list
```

Items

Modify

PRO

Add the **child** of an object to another object

```
const item1 = Scene.getItem("item1ID");
const item2 = Scene.getItem("item2ID");

item1.add(item2);
// Adds item2 as a child of item1
```

Attach an object to another object

```
let item1 = Scene.getItem("Item1");
let item1_slot = item1.getSlot('Top');

let item2 = Scene.getItem("Item2");
let item2_slot = item2.getSlot('Bottom');

item2_slot.attachTo(item1_slot);
// Attaches item2 to item1 using their respective slots
```

Detach an object from the object it's attached to

```
let item = Scene.getItem("itemID");

item.removeFromParent();
// Detaches the object from the parent it's attached to
```

Delete an object

```
let item = Scene.getItem("itemID");

item.delete();
// Deletes the object
```

Delete all children of an object

```
let item = Scene.getItem("itemID");

item.deleteChildren();
// Deletes all children of the object
```

Activate physics on an object

```
item.physics.enabled = true;
// Enables physics for the object
```

Disable physics on an object

```
let item = Scene.getItem("itemID");

item.physics.enabled = false;
// Disables physics for the object
```

Add an **object** at a certain position and with a certain name

```
let capsule = Scene.createCapsule(0, 0, 0);
// Creates a capsule at position (0, 0, 0)

capsule.name = "MyCapsule";
// Sets the name of the capsule
```

Change the **name** of an object

```
let item = Scene.getItem("itemID");

item.name = "MyItem";
// Sets the name of the item to "MyItem"
```

Get

BASIC

Get a certain **item**

```
let item = Scene.getItem("itemID");
```

Get a certain **group item**

```
const myGroup = Scene.getItem("GroupID");
// Retrieves the group item with the specified GroupID
```

PRO

Get a certain **camera** object

```
const MyCam = Scene.getItem("cameraID") as CameraItem;
// Retrieves the camera object with the specified cameraID
```

Get a certain **path** object

```
const MyPath = Scene.getItem("pathID") as PathItem;
// Retrieves the path object with the specified pathID
```

Get a certain **text** object

```
const myText = Scene.getItem("textID") as TextItem;
// Retrieves the text object with the specified textID
```

Get a certain **3D text** object

```
const myTextin3D = Scene.getItem("3dtextID") as Text3DItem;
// Retrieves the 3D text object with the specified 3dtextID
```

Get a certain **video**

```
const myVideo = Scene.getItem("videoID") as VideoItem;
// Retrieves the video object with the specified videoID
```

Get an object of a certain **name**

```
let item = Scene.getItem("Camel");
// Retrieves the object named "Camel"
```

Get the name of a certain **object**

```
let name = item.name;
// Retrieves the name of the object
```

Duplicate a certain object

```
let item = Scene.getItem("itemID");

item.copy();
// Duplicates the object
```

Get the **parent** of a certain object

```
let item = Scene.getItem("itemID");
let parent = item.parent;
// Gets the parent of the object
```

Get the **number of children** of a certain object

```
let item = Scene.getItem("itemID");
let childrenCount = item.children.length;
```

Get a certain **object's child** with index 0

```
let item = Scene.getItem("itemID");
let child = item.children[0];
```

Logs the child with index 0 of the object

```
Debug.log(`Child with index 0 is: ${child.name}`);
// Gets and logs the child with index 0 of the object
```

Check whether a certain **video is playing**

```
const myVideo = Scene.getItem("videoID") as VideoItem;
let checkVideo = myVideo.video.playing;

if (checkVideo === true) {
    Debug.log("The video is playing");
} else {
    Debug.log("The video is not playing");
}
// Checks whether the video is currently playing and logs the result
```

Data

Variables

PRO

Create a variable with a certain initial value

```
let myVar = "";
// Initializes the variable myVar with an empty string

Debug.log(`The initial value of myVar is: '${myVar}'`);
// Logs the initial value of the variable
```

Store a certain **CoSpace variable** under a certain name in order to reuse it in another scene *

```
let key = "lives";
let value = "3";
Space.setProperty(key, value);
// Stores the value "3" under the key "lives" in the CoSpace

Debug.log(`Stored property: ${key} = ${value}`);
// Logs the key-value pair stored in the CoSpace
```

Get the **stored CoSpace value** *

```
let key = "lives";
let storedValue = Space.getProperty(key);
// Retrieves the stored value associated with the key "lives"

Debug.log(`The stored value for ${key} is: ${storedValue}`);
// Logs the retrieved value for the key
```

Increase or decrease the value of a **variable**

```
let myVariable = 0;  // Define your variable with an initial value
myVariable += 1;     // Increment the variable by 1
Debug.log(myVariable);  // Logs the current value of myVariable (which is 1)
```

Values

PRO

Use **false** (or true)

```
let condition = false;
```

Use a **certain number**

```
let myNumber = 0;
```

Use a certain **mathematical constant** (like π)

```
let pi = Math.PI;
// Uses the mathematical constant Pi (π)
```

Use **no value**

```
let anything = null;
// Assigns no value (null) to the variable

Debug.log(`The value is: ${anything}`);
// Logs 'null' because the variable has no value
```

Use a **random color**

```
let myColor = Color.random();
// Generates a random color and assigns it to myColor
```

Get the **color** of a certain object

```
const item = Scene.getItem("cuboidID") as Cuboid;
let itemColor = item.color;
// Retrieves the color of the cuboid and assigns it to itemColor
```

Use a certain **color** you pick

```
let myColor = Color.white;
// Assigns the color white to myColor
```

Use a certain **color** you define with its **RGB** values

```
let myColor = new Color(100, 0, 0);
// Defines a color with RGB values (100, 0, 0)
```

Create a **text string** with text you define

```
let myString = "ABC";
// Creates a string with the value "ABC"

Debug.log(`The string is: ${myString}`);
// Logs the string
```

Use a **text** that you define

```
let myText = Scene.getItem("textID") as TextItem;
myText.text = "Lives";
// Sets the text of the TextItem to "Lives"
```

Use certain **coordinates**

```
let myCoordinates = new Vector3(0, 0, 0);
// Defines a coordinate with x: 0, y: 0, z: 0
```

Use a certain **coordinate**

```
let xValue = myCoordinates.x;
// Retrieves the x value of the coordinates
```

Use the **length** of a certain **variable**

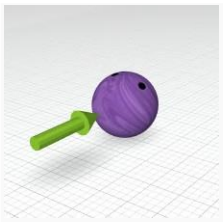
```
let myVariable = [1, 2, 3, 4, 5];
// Defines a variable as an array with 5 elements

let lengthOfVariable = myVariable.length;
// Gets the length of the array

Debug.log(`The length of the variable is: ${lengthOfVariable}`);
// Logs the length of the variable
```

Physics

Note: To use physics on an item, **`enable` physics** with the item inspector. By default, items ignore physics collisions and forces.

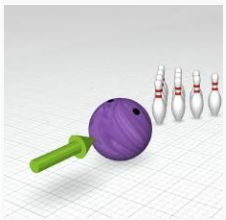
Simple

PRO



Push a certain object **in** a certain **direction**

```
let item = Scene.getItem("objectID");
item.physics.enabled = true;
item.physics.applyForce(new Vector3(0, 0, 500));
// Applies constant directional force to this item each frame.
```

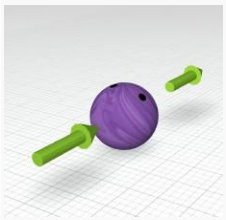


Push an object **towards** another **object**

```
const distance = item1.center.sub(item2.center);
// Subtracts item2's position from item1's position to calculate the direction

item2.physics.applyImpulseLocal(Vector3.zero, distance);
// Pushes item2 towards item1 by applying an impulse in the direction of the distance
```

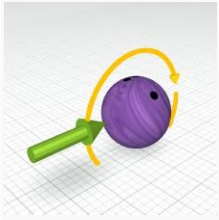
Push an object **towards** a certain **position**

```
let distance = new Vector3(10, -10, 0).sub(item.center);
// Subtracts the item's position from a specific position (Vector3(10, -10, 0))

item.physics.applyImpulseLocal(Vector3.zero, distance);
// Pushes the item towards the position, by applying an impulse in that direction
```



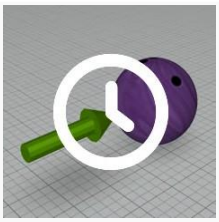
Push an object **in** a certain **direction** at a certain speed

```
item.physics.enabled = true;
// Enables physics for the item

Physics.physicsSpeed = 0.5;
// Sets the overall physics speed to 0.5, making the physics simulation slower

item.physics.applyImpulseLocal(Vector3.zero, new Vector3(0, 100, 0));
// Applies an impulse upwards along the Y-axis to the item
```



Make a certain object **spin** in a certain direction

```
item.physics.angularVelocity = new Vector3(0, 0, 2);
// Sets the angular velocity of the item to spin along the Z-axis

item.physics.restrictRotationAxis({ x: true, y: true, z: false });
// Restricts rotation, allowing the object to spin only around the Z-axis

item.physics.friction = 0;
// Removes friction, allowing the object to spin without slowing down
```



Define a **duration for physics TypeScript code** to get executed

```
Time.schedule(() => {
    Physics.paused = true;
    // Pauses the physics simulation. If 'true', physics will stop simulating
}, 2);
// Executes the physics block after 2 seconds
```

Advanced

PRO

Set the local or global speed for a certain physics object

```
const item = Scene.getItem("itemID");
item.physics.velocity = new Vector3(0, 10, 0);
// Sets the velocity of the item to (0, 10, 0) along the Y-axis
```

Set the local or global angular speed for a certain physics object

```
const item = Scene.getItem("itemID");
item.physics.angularVelocity = new Vector3(0, 0, 20);
// Sets the angular velocity of the item to rotate around the Z-axis at 20 units
```

Properties

PRO

Restrict the **movement** of an object on axes

```
const item = Scene.getItem("itemID");
item.physics.restrictRotationAxis({ x: true, y: false, z: true });
// Restricts rotation on the X and Z axes, but allows rotation on the Y axis
```

Define whether an object is **static** or not

```
const item = Scene.getItem("itemID");
item.physics.static = true;
// Makes the item static, preventing it from moving or being affected by forces
```

Define whether an object can **collide** with other objects

```
const item1 = Scene.getItem("item1ID");
const item2 = Scene.getItem("item2ID");

item2.physics.addToCollisionFilter(item1);
// Adds item2 to the collision filter of item1, allowing item2 to pass through item1
```

Define the **friction** level of a certain object

```
let item = Scene.getItem("itemID");
item.physics.friction = 0.5;
// Value of 0 resembles ice (very slippery)
// Value of 1 resembles a surface with high friction, e.g., car tyre
```

Define the **weight** (mass) of a certain object

```
let item = Scene.getItem("itemID");
item.physics.mass = 500;
// Defines the mass of the item.
// Items with higher mass more easily push away items with lower mass.
```

Define the **bounciness** level of a certain object

```
let item = Scene.getItem("itemID");
item.physics.restitution = 1;
// Defines the bounciness of the item
// Restitution of 0 does not cause the item to bounce
// Restitution of 1 causes the item to bounce without any loss of energy
```

Define the **gravity** level in your scene

```
Physics.gravityAcceleration = 0;
// Defines the gravity acceleration of the physics simulation.
// A value of 0 results in no gravity, so items will float.
// Negative values cause items to fall 'up'.
```

Change the **speed** at which **physics** happen (1 = standard speed)

```
Physics.physicsSpeed = 5;
// Defines the speed of the physics simulation.
// Low values (below 1) allow you to create slow-motion simulations.
// Higher values (above 1) speed up the simulation.
```

Functions

Simple

PRO

Stop a **function** from executing further

```
function myFunction() {
    // Some code
    if (someCondition) {
        return; // Stops the function and exits
    }
    // More code that won't execute if the condition is true
}
```

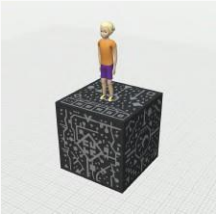
Return a certain **value from a function**

```
function myFunction(): number {
    return 1; // Returns the value 1
}

let result = myFunction();
Debug.log(result); // Logs the returned value (1) to the console
```

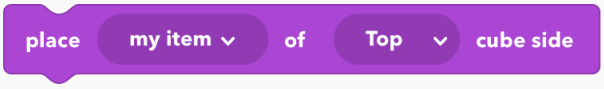
MERGE Cube

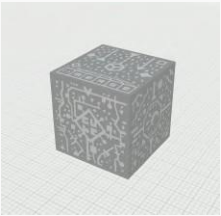
Actions – no Typescript code for Merge cube

PRO

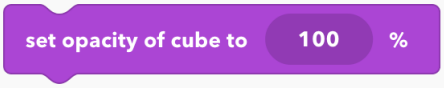


Place a certain object **on** a certain **side** of the MERGE Cube

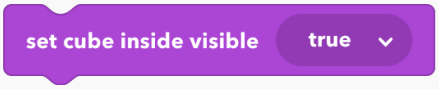




Change the **opacity** level of the MERGE Cube



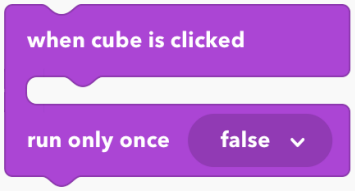
Make the **inside** of the MERGE Cube **visible or invisible**

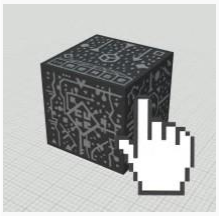


Events - no Typescript code for Merge cube

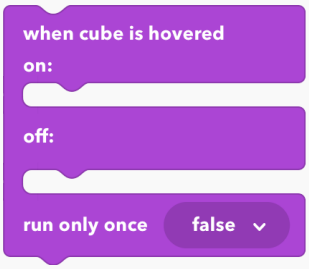
PRO

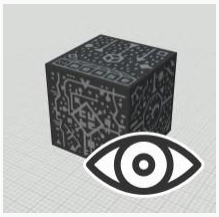
Make an action **happen when** the MERGE Cube **is clicked** and define whether it should happen only once or more



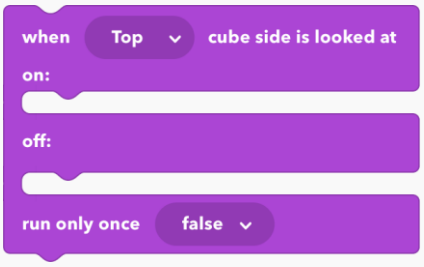


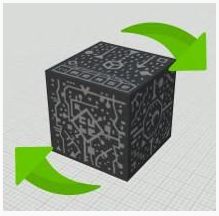
Make an action **happen when** the MERGE Cube **is hovered** and define whether it should happen only once or every time it is hovered



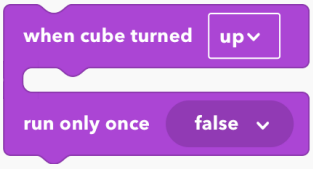


Make an action **happen** when **looking** at a certain **side** of the MERGE Cube and define whether it should happen only once or every time it is looked





Make an action **happen** when the MERGE Cube is **turned** a certain way and define whether it should happen only once or every time the MERGE Cube is turned



Stop a group of MERGE Cube **actions from happening**

Simple - no Typescript code for Merge cube

PRO

Use a certain **side** of the MERGE Cube

Use the **visible side** of the MERGE Cube (the one the camera is currently looking at)

Notes *

Storing CoSpace property values between TS scripts in ONE scene

storedLivesTS

```
// Define and export the class storedLives
export class storedLives {
    lives: number;

    constructor(lives: number) {
        this.lives = lives;
    }
}

// Set the "storedLives" property in the Scene
Scene.setProperty("storedLives", "3");
```

With this code, you can set CoSpace property, export the *stored Lives* class and manage the lives within your CoSpace project.

mainTS

```
import { storedLives } from './storedLivesTS';

// Assuming the lives are stored in Scene's property
let storedLivesValue = Scene.getProperty("storedLives")      ;
let livesInstance = new storedLives(Number(storedLivesValue));

Debug.log(`Lives: ${livesInstance.lives}`);  // Logs the value (e.g., 3)
```

With this code you can get the CoSpace property, by importing the *stored Lives* class and further manage the lives within your CoSpace project.