# **Exercises: TypeScript**

## **1. Part 0 - Get the Starter Code**

Use the terminal to navigate into the **Hands On Assignments\TypeScript Exercises** folder, then into the **exercises** subfolder.

$ dir

TypeScript Exercises TypeScript Lab

$ cd **TypeScript Exercises**

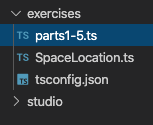
$ cd **exercises**

$ dir

SpaceLocation.ts parts1-5.ts tsconfig.json

## **2. Part 1 - Declare Variables With Type**

Run VSCode and open the **exercises** folder. From the file tree, select the **parts1-5.ts** file.



*VSCode file tree*

| **Variable Name** | **Type** | **Value** |
| --- | --- | --- |
| spacecraftName | string | **'Determination'** |
| speedMph | number | 17500 |
| kilometersToMars | number | 225000000 |
| kilometersToTheMoon | number | 384400 |
| milesPerKilometer | number | 0.621 |

In the space indicated, declare and assign a variable for each of the following:

## **3. Part 2 - Print Days to Mars**

In the same file you opened in Part 1, do the following.

1. Declare and assign these variables.
   1. Remember: variable declarations in TypeScript include the type!
   2. **milesToMars** is a number with the value of **kilometersToMars \* milesPerKilometer**.
   3. **hoursToMars** is a number with the value of **milesToMars / speedMph**.
   4. **daysToMars** is a number with the value of **hoursToMars / 24**.
2. Write a **console.log** statement that prints out the days to Mars.
   1. Use template literal syntax and the variables **${spacecraftName}** and **${daysToMars}**.
3. Use the terminal in VSCode to compile your **.ts** file, then use the command **node parts1-5.js** to run the JavaScript file created during the build process.

****Terminal****

$ tsc parts1-5.ts

$ node parts1-5.js

Determination would take 332.67857142857144 days to get to Mars.

## **4. Part 3 - Create a Function**

1. In the space indicated, define a function that calculates the days it would take to travel to a location.
   1. Function name **getDaysToLocation**
   2. Parameter

* **kilometersAway** must be a number.
  1. Returns the number of days to a location.
* Use the same calculations as in Part 2.1.
* Inside the function, make the variable names generic. Use **milesAway** and **hoursToLocation** instead of **milesToMars** and **hoursToMars**.
* The function should declare that it returns a **number**.

1. Print out the days to Mars.
   1. Move the output statement from part 2 below your new function.
   2. Refactor the template literal to use **${getDaysToLocation(kilometersToMars)}** and **${spacecraftName}**.
2. Print out the days to the Moon.
   1. Add another output statement and template literal using **${getDaysToLocation(kilometersToTheMoon)}** and **${spacecraftName}**.
3. Use the terminal in VSCode to recompile your **.ts** file, then run the **parts1-5.js** file again.

****Terminal****

$ tsc parts1-5.ts

$ node parts1-5.js

Determination would take 332.67857142857144 days to get to Mars.

Determination would take 0.5683628571428571 days to get to the Moon.

## **5. Part 4 - Create a Spacecraft Class**

Organize **getDaysToLocation** and the variables for name, speed, and miles per kilometer by moving them into a class.

1. Define a class named **Spacecraft**.
   1. Properties

* **milesPerKilometer: number = 0.621;**
* **name: string;**
* **speedMph: number;**
  1. Constructor
* **name** is the first parameter and it MUST be a string.
* **speedMph** is the second parameter and it MUST be a number.
* Sets the class properties using **this.name** and **this.speedMph**.

**Note**

Once you complete the constructor, be sure to remove the variables you defined in part 1 (**spacecraftName**, **milesPerKilometer**, and **speedMph**.

1. Move the function getDaysToLocation, defined in Part 3, into the Spacecraft class.
   1. Remember to place the function after the constructor.
   2. Update the function to reference the class properties **this.milesPerKilometer** and **this.speedMph**.
2. Create an instance of the Spacecraft class.
   1. **let spaceShuttle = new Spacecraft('Determination', 17500);**
3. Print out the days to Mars.
   1. Use template literals, **${spaceShuttle.getDaysToLocation(kilometersToMars)}** and **${spaceShuttle.name}**.
4. Print out the days to the Moon.
   1. Use template literals, **${spaceShuttle.getDaysToLocation(kilometersToTheMoon)}** and **${spaceShuttle.name}**.
5. Use the terminal in VSCode to recompile your .ts file, then run the .js file again.

****Terminal****

$ tsc parts1-5.ts

$ node parts1-5.js

Determination would take 332.67857142857144 days to get to Mars.

Determination would take 0.5683628571428571 days to get to the Moon.

## **6. Part 5 - Export and Import the SpaceLocation Class**

1. From the file tree in VSCode, open the **SpaceLocation.ts** file.
2. Paste in the code provided below.
   1. Notice the **export** keyword. That is what allows us to import it later.

|  |  |
| --- | --- |
| 1  2  3  4  5  6  7  8  9 | **export** **class** SpaceLocation {  kilometersAway: number;  name: string;  constructor(name: string, kilometersAway: number) {  **this**.name = name;  **this**.kilometersAway = kilometersAway;  }} |

1. Add the function printDaysToLocation to the Spacecraft class.
   1. Notice that it takes a parameter of type **SpaceLocation**.

|  |  |
| --- | --- |
| 1  2  3 | printDaysToLocation(location: SpaceLocation) {  console.log(`${**this**.name} would take ${**this**.getDaysToLocation(location.kilometersAway)} days to get to ${location.name}.`);} |

1. Import SpaceLocation into parts1-5.ts.
   1. Paste **import { SpaceLocation } from './SpaceLocation';** to the top of **parts1-5.ts**.
2. Replace the earlier console.log statements by using the class instance to print out the days to Mars and the Moon.

|  |  |
| --- | --- |
| 47  48 | spaceShuttle.printDaysToLocation(**new** SpaceLocation('Mars', kilometersToMars));spaceShuttle.printDaysToLocation(**new** SpaceLocation('the Moon', kilometersToTheMoon)); |

1. Use the terminal in VSCode to compile your .ts file, then run the .js file again.

****Terminal****

$ tsc parts1-5.ts

$ node parts1-5.js

Determination would take 332.67857142857144 days to get to Mars.

Determination would take 0.5683628571428571 days to get to the Moon.

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