# Using let Variables

ECMAScript 6 introduces a new keyword to declare variables: `let`. Unlike variables declared with `var` that are function-scoped, variables declared with `let` are block-scoped: they only exist in the block they are defined in.

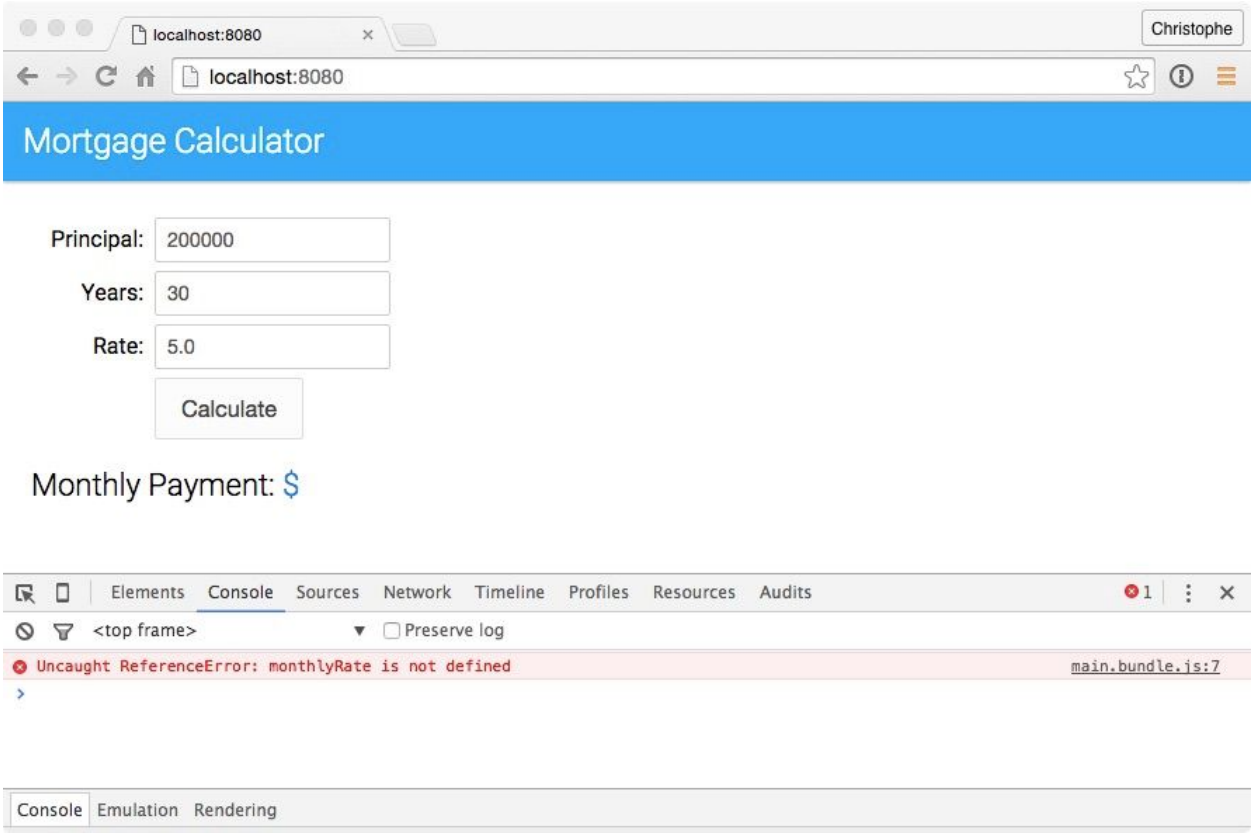
In this unit, you modify the application to use `let` variables.

## Steps

1. In your code editor, open `js/main.js` and examine the `calculateMonthlyPayment` function:
2. ```
   var calculateMonthlyPayment = function(principal, years, rate) {
       if (rate) {
           var monthlyRate = rate / 100 / 12;
       }
       var monthlyPayment = principal * monthlyRate /
                            (1 - (Math.pow(1/(1 + monthlyRate), years * 12)));
       return monthlyPayment;
   };
   ```

3. Notice that on line 5, the `monthlyRate` variable is available even though it was declared within the `if`block. This is because variables declared with `var` are **function-scoped**, and not **block-scoped**. This way of declaring and using variables is definitely not a best practice: it is used here to illustrate the difference between function-scoped and block-scoped variables.
4. To keep the code simple and readable, the field validation used in this sample application is intentionally simplistic and incomplete.
5. Replace all the occurrences of `var` with `let`. **Don't change anything else yet**.
6. main.js now includes ECMAScript 6 code and will no longer work in ECMAScript 5 browsers.
7. On the command line, type the following command to run the **babel** script and compile `main.js` to ECMAScript 5:
8. ```
   npm run babel
   ```

9. Open a browser, access http://localhost:8080, and click the **Calculate** button: **it doesn't work**. Open the developer console. You should see a message similar to this:




10.
11. This is because unlike `var` variables which are **function-scoped**, `let` variables are **block-scoped**: they only exist in the block they are defined in.
12. In `main.js`, modify the `calculateMonthlyPayment` function as follows:
13.
```
let calculateMonthlyPayment = function(principal, years, rate) {
    let monthlyRate = 0;
    if (rate) {
        monthlyRate = rate / 100 / 12;
    }
    let monthlyPayment = principal * monthlyRate /
                         (1 - (Math.pow(1/(1 + monthlyRate), years * 12)));
    return monthlyPayment;
};
```

14. On the command line, type the following command to rebuild the application:
15. `npm run babel`

16. Open a browser, access http://localhost:8080, and click the **Calculate** button: you should now see the monthly payment.

17. If you are still seeing the error, make sure you clear your browser’s cache and refresh the page.