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Part 1. Getting started

.1 Setting up NodeJS, Visual Studio Code and Git

Install the required software

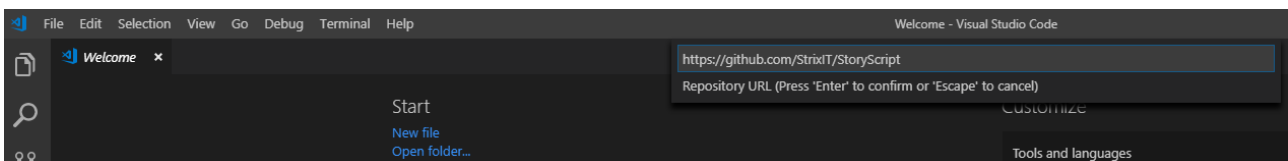
To get started creating games with StoryScript, there are a couple of tools you need to install and configure. First of all, you'll need **NodeJs** to be able to build and run your game. Download it from <https://nodejs.org> and run the installer.

To work with StoryScript effectively, you should use an editor that supports you in creating your game components like HTML and TypeScript files. Also, out-of-the-box support for Git is a great bonus. A good choice is **Visual Studio Code**. This is a product related to the full-fledged Visual Studio, but much more lightweight and, more important, also available on operating systems other than Microsoft Windows. Of course, you can also use the full Visual Studio if you want.

This tutorial will assume you are using Visual Studio Code, and it will help you set it up for Windows. The first step is to download and install it. Go to <https://code.visualstudio.com/download> and download and install the program (the default settings are fine if you are unsure what to choose when you are presented with options).

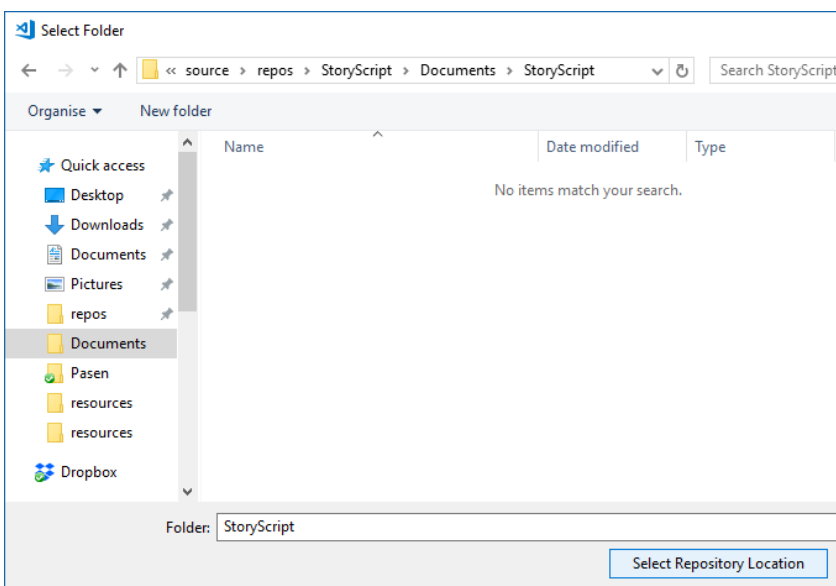
Get the StoryScript code

Now that you have your development environment set up, it is time to get the StoryScript code from GitHub. You can do this directly from Visual Studio Code. Start the program, open the command palette (**CONTROL + SHIFT + P**), select the **Git: Clone** command, pass in the StoryScript URL (<https://github.com/StrixIT/StoryScript>) and press **ENTER**:

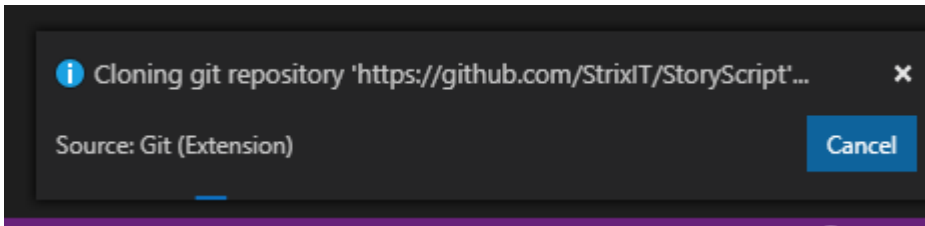


If you get an error that the command is not found, you need to install Git for windows. You can download it from <https://git-scm.com/download/win>. There are a number of options to choose from during the install, you should be fine using the defaults selected. Once you're done, close and re-open Visual Studio Code and try again.

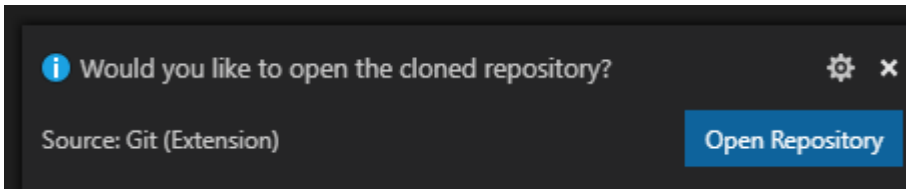
Select a folder on your computer or create a new one to clone StoryScript to:



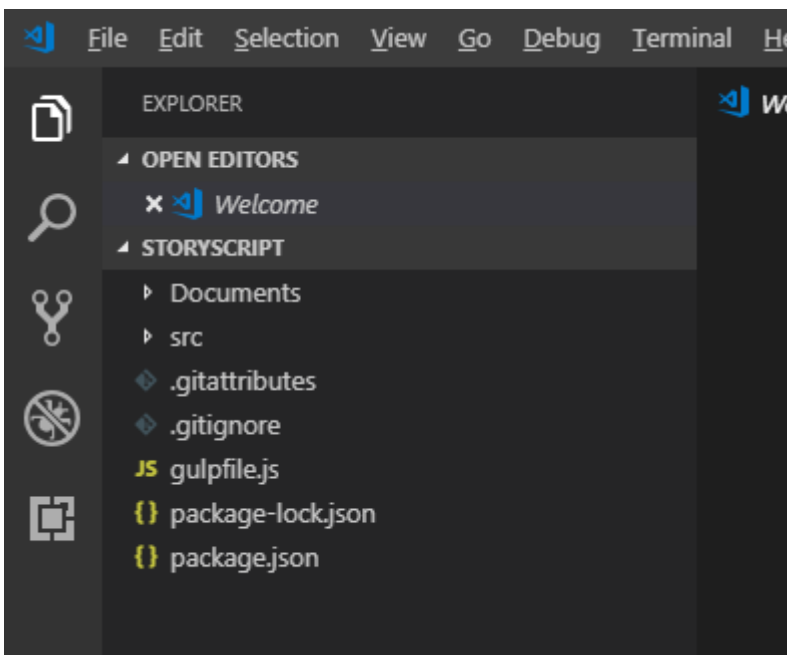
You should see a message in the lower right corner that a clone is in progress:



When done, opt to open the new repository:

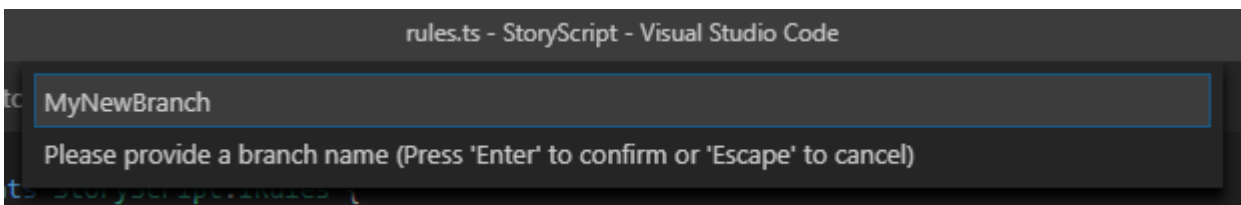


You should see the StoryScript folder open in your explorer on the left:

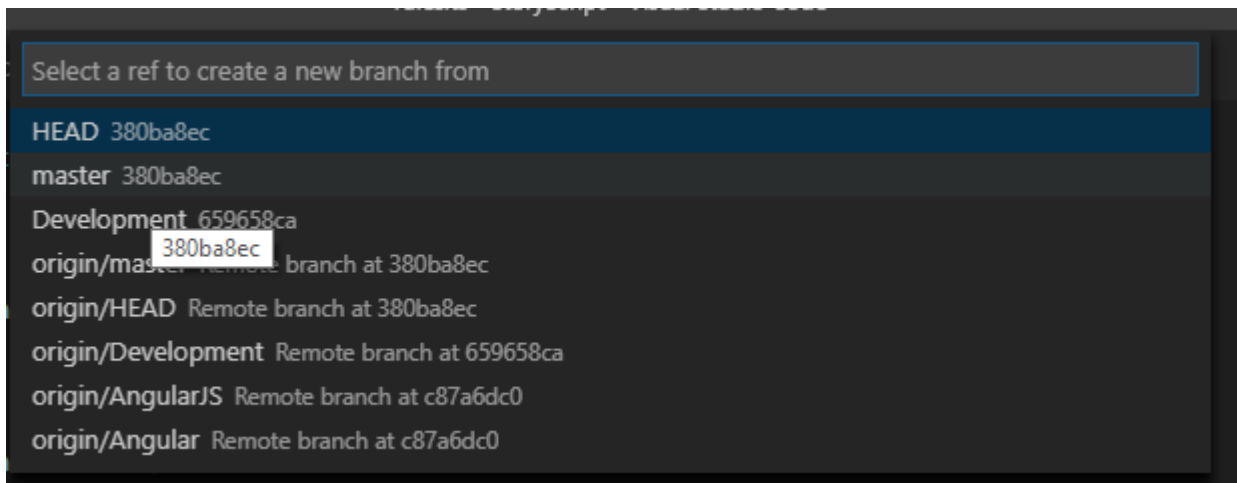


Create your own StoryScript branch

Now that you have a copy of the master branch of StoryScript, you need to create a branch of your own to work on. Again from the command palette, select **Git: Create Branch**, type a name for your branch and press enter:



Select the master (not the origin/master) branch as the reference for your new branch:



Your new branch should be created and you should switch to it automatically. You can see the branch you're on in the lower left corner:



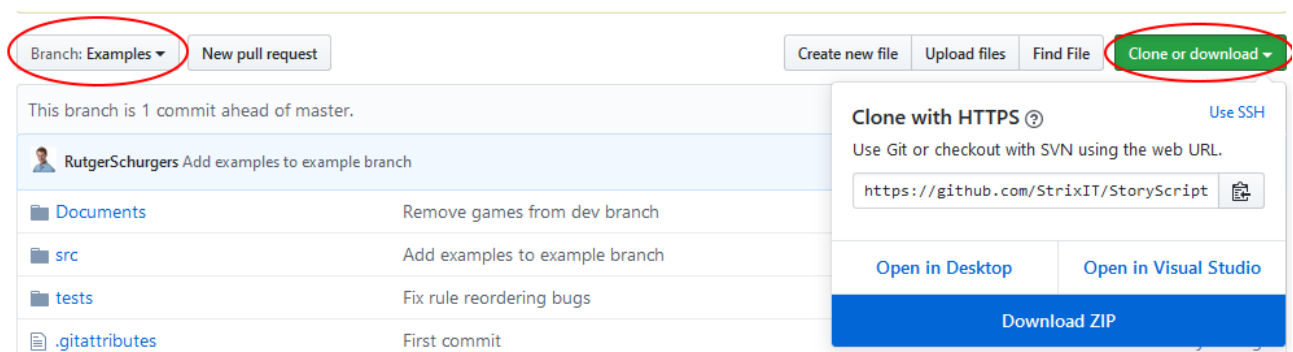
You can publish your branch if you have a GitHub account using the **Git: Publish Branch** command. You'll be asked for your GitHub credentials when you run the command, after which your branch is added. You can then store your code online. From now on, you can use Git to control your StoryScript sources and update the StoryScript engine to the latest version. More on that in the chapter on git in part 5.

Great, now just one more step before you are all set up! Open the integrated development console by pressing **CONTROL + ``**. Then install all the required packages by typing **'npm install'** (enter). Wait until the installation is done.

Now, you can finally start working on your game. You can skip to chapter 2 now, though it is worth reading through the remaining parts of this chapter to be better prepared.

Working with the example games

You will be creating several example games in this tutorial. You can find the completed versions of these on the Examples branch. Use that branch to see them in action, or to copy code instead of typing it in yourself when working on the tutorials. Perhaps easiest to do while following the tutorial is to copy the code from the Examples branch to a separate location on your disc so you can copy and paste files from there. You can easily do this by downloading a zip archive of the branch from the StrixIT StoryScript GitHub site at <https://github.com/StrixIT/StoryScript/tree/Examples>. Check you're on the correct branch and then download the zip file:

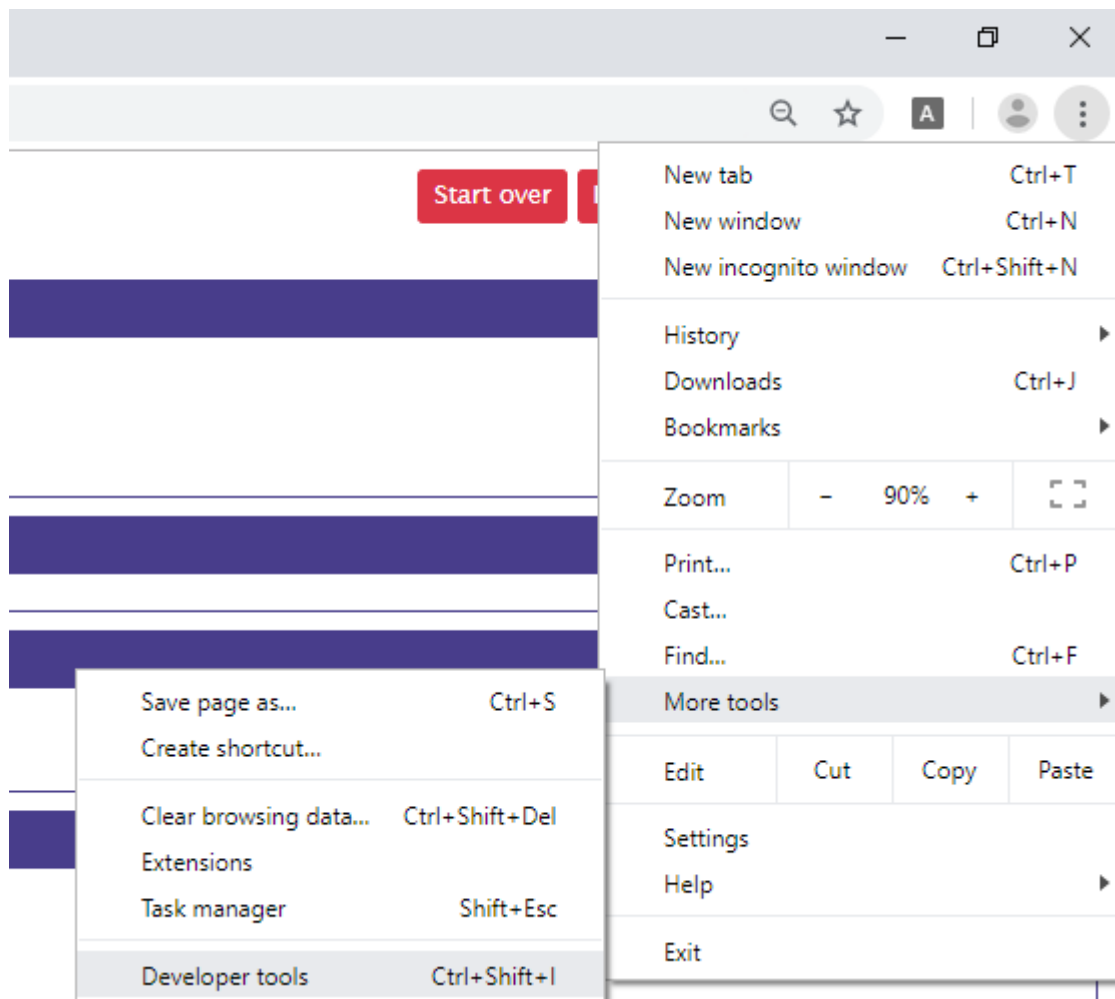


You can also find the examples running online. At the beginning of each chapter, a link is included that you can use to see the game in action.

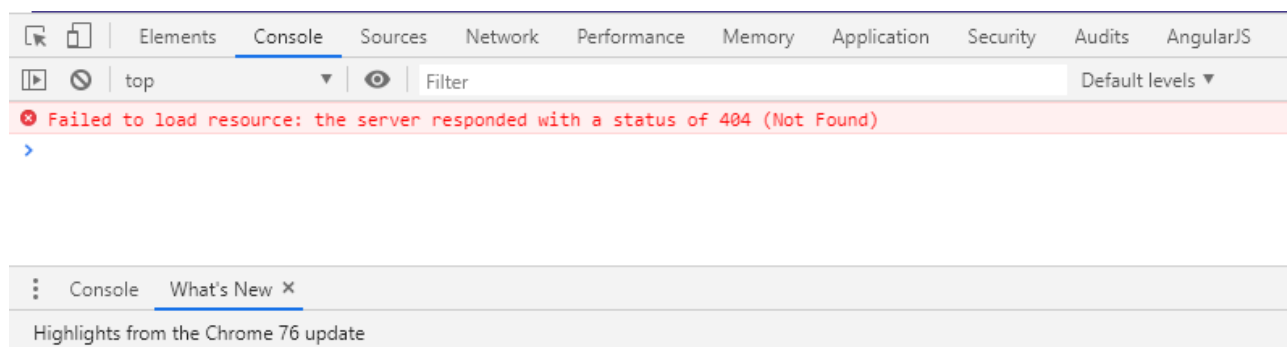
Troubleshooting StoryScript

During game creation, as with any software development, things will go wrong. Here are two important tips to help you find out what's going on so you can correct problems yourself or report problems for fixing:

1. Use the developer tools of your browser while working on your game. Some problems that StoryScript can detect (like locations with no destinations and locations without html files for them) will be logged to the browser console. In Chrome, you can press **F12** or use the right-hand menu to open them:



The tools will open at the bottom of the browser window:



You can undock them and move them to a separate window if you want.

2. Don't change the properties listed here from code. As they are always refreshed from html source files for a better editing experience. Changes done to them through code won't be saved:
 - a. Any properties called 'description', 'descriptions' or 'text'. (on locations, enemies, etc.)
 - b. Any properties on conversation nodes.

.2 Decide what type of game you want to build

StoryScript started out as a simple engine for interactive stories, which basically are stories in which you as a reader make choices from time to time. From there, it expanded to support much more. You can now also create role playing games and adventure games with it.

StoryScript comes with several screen components that make up your game. Not all components make sense for all types of games. For example, in an interactive story you wouldn't need an equipment screen, and probably can also do without a backpack and most other additions needed for creating games that are more than stories with choices. It is easiest to get started by focusing on just the components you need. You can always add more components later when they are required after all.

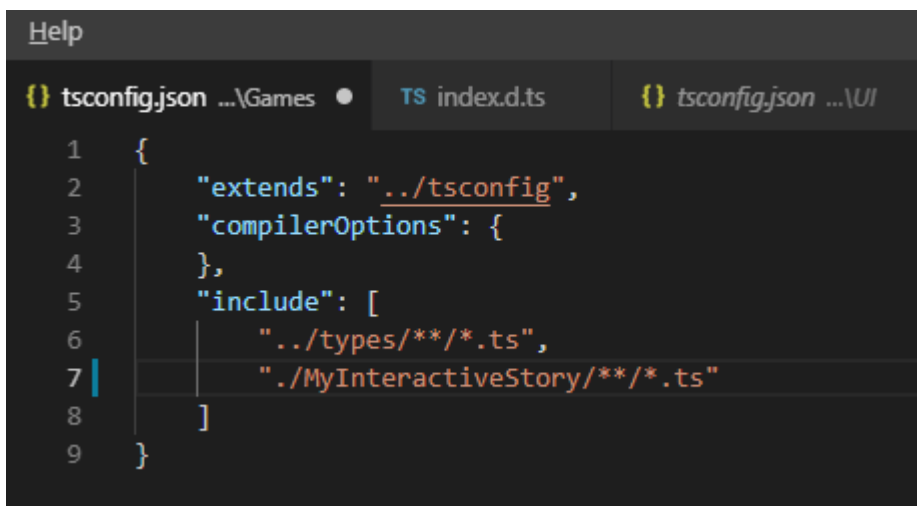
In this tutorial, we'll be creating a few example games, starting with a simple interactive story. This will introduce some critical concepts that you need to understand for creating any StoryScript game. Having done that, we'll move on to creating first adventure and then role playing games.

.3 Creating a new game

When creating a new game, you need to select either a basic interactive story setup or a standard setup. Apart from this, the process of creating a new game and starting it for the first time is similar so we'll cover it once here before moving on to discussing the different types of games.

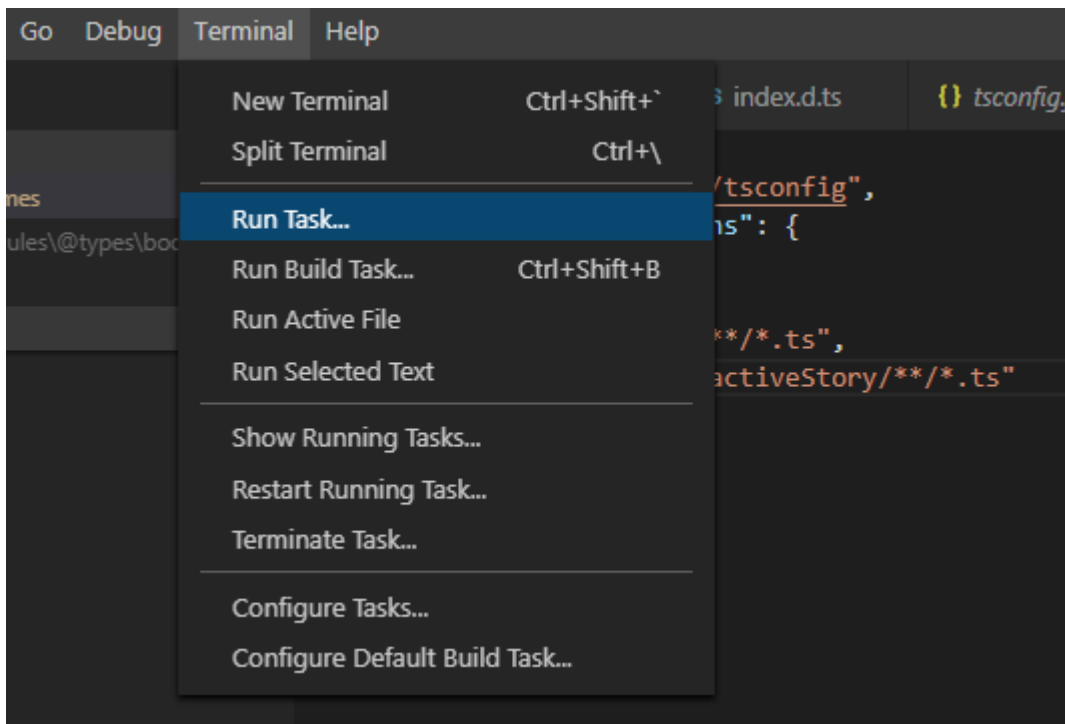
To start working on a new StoryScript game, first choose a name for it, without spaces or special characters. Let's use **MyInteractiveStory** as an example.

Open the **tsconfig.json** file in the **src/Games** folder of the StoryScript project and change the line `"./_GameTemplate/**/*.ts",` to `"./MyInteractiveStory/**/*.ts",`:

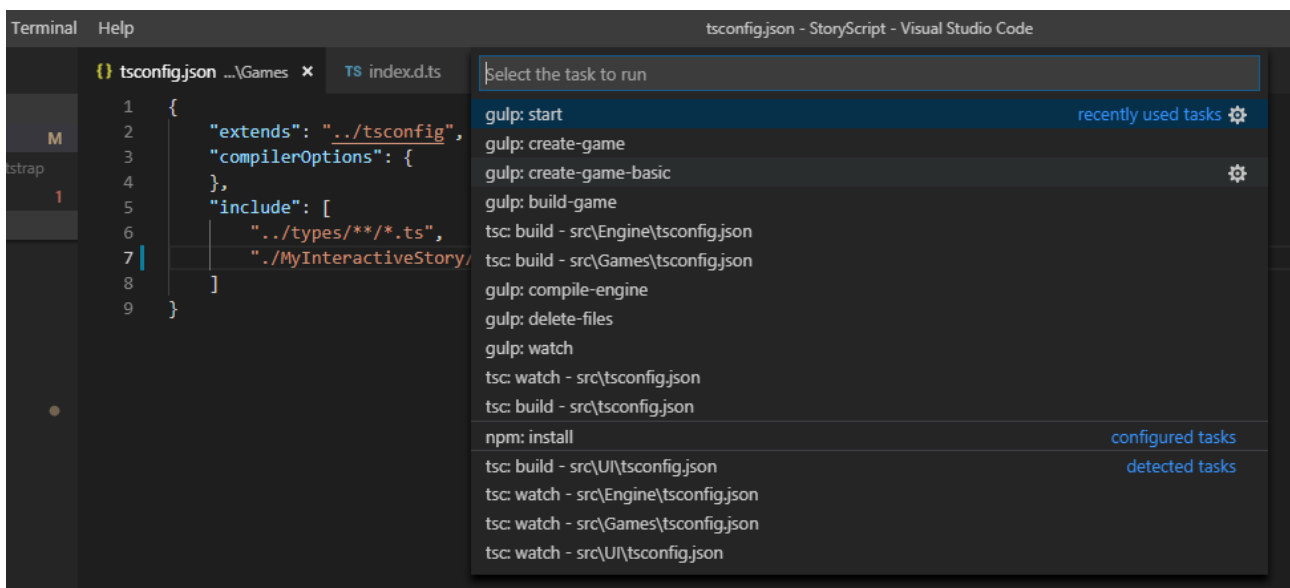


```
Help
{} tsconfig.json ...\Games • TS index.d.ts {} tsconfig.json ...\UI
1 {
2   "extends": "../tsconfig",
3   "compilerOptions": {
4   },
5   "include": [
6     "../types/**/*.ts",
7     "./MyInteractiveStory/**/*.ts"
8   ]
9 }
```

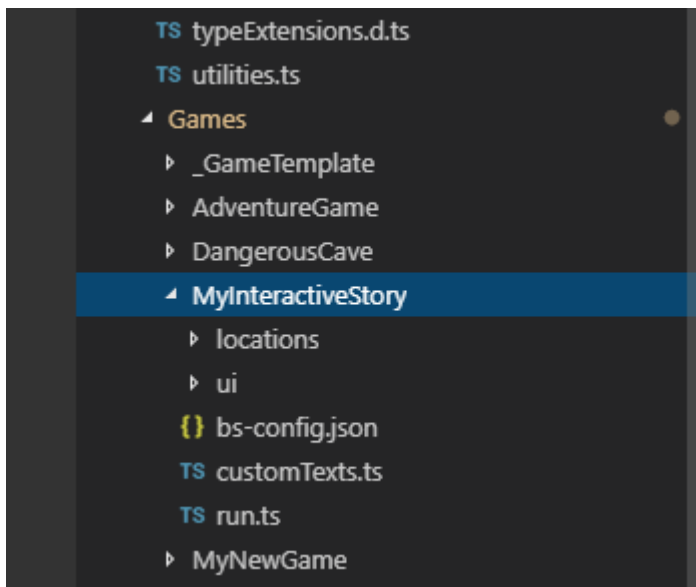
With that setup in place, go to the **Terminal** menu and select **Run Task...**:



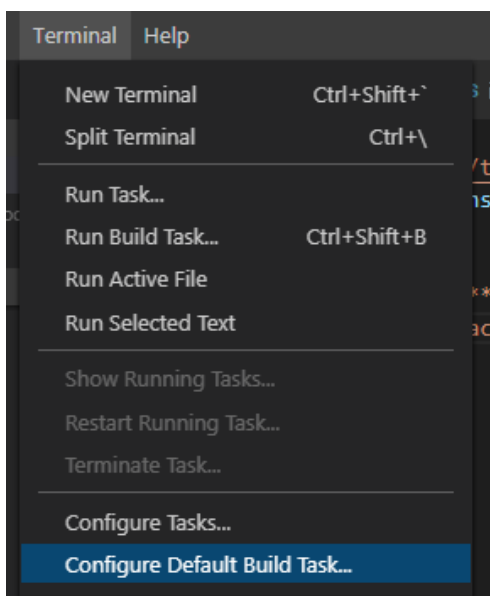
From the list, click '**gulp:create-game-basic**' to create a new interactive story (use the '**gulp:create-game**' task for a standard setup):



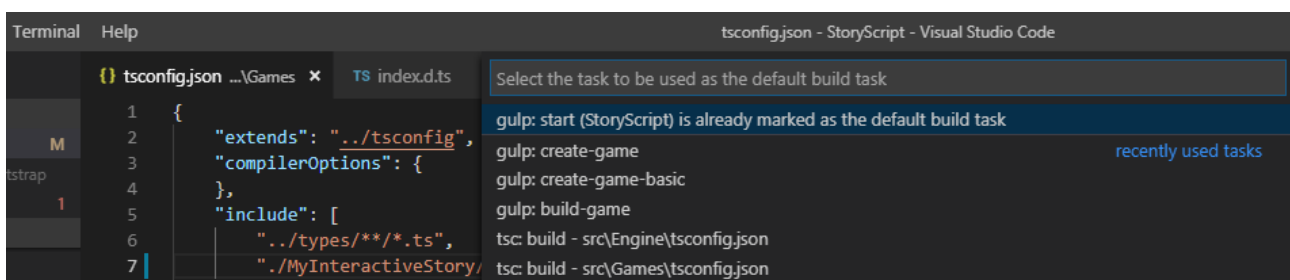
When presented with more options, select 'Continue without scanning'. Then, the create task should run and a new folder with your game should appear in the Games folder:



You should now be able to build and run your game. Configure your default build task using the **Configure Tasks** from the Terminal menu:



There, select the **'gulp:start'** task:



Your **tasks.json** should open, showing you something like this:


```
JS gulpfile.js  {} tasks.json x
1  {
2      // See https://go.microsoft.com/fwlink/?LinkId=733558
3      // for the documentation about the tasks.json format
4      "version": "2.0.0",
5      "tasks": [
6          {
7              "type": "gulp",
8              "task": "start",
9              "group": {
10                 "kind": "build",
11                 "isDefault": true
12             },
13             "problemMatcher": []
14         }
15     ]
16 }
```

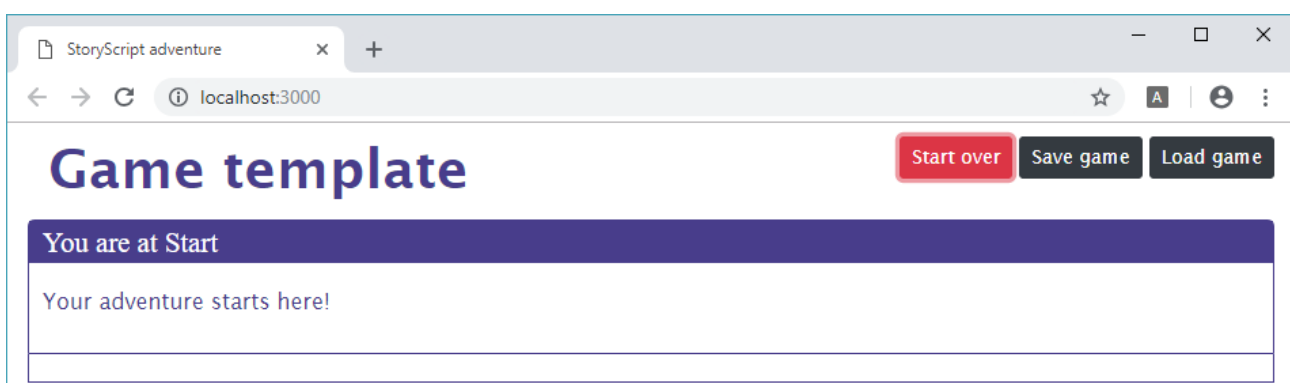
If the group information isn't there, add it. Then, press '**CONTROL-SHIFT-B**' to build and run the game. You should see this output in the integrated terminal:

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL
2: Task - start

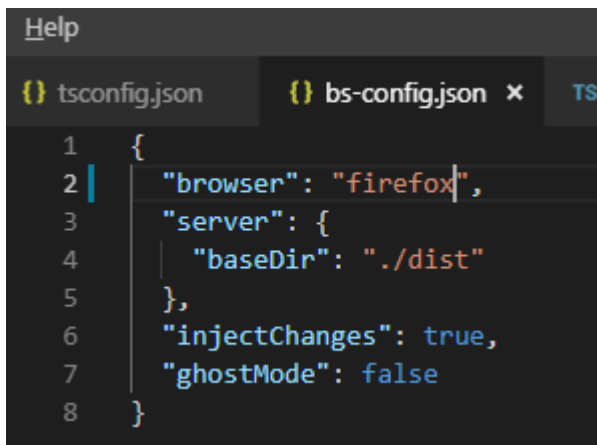
> Executing task: node_modules\.bin\gulp.cmd start <

[11:28:49] Using gulpfile ~\source\repos\StoryScript\gulpfile.js
[11:28:49] Starting 'delete-files'...
[11:28:49] Finished 'delete-files' after 23 ms
[11:28:49] Starting 'compile-engine'...
[11:28:52] Finished 'compile-engine' after 3.26 s
[11:28:52] Starting 'build-game'...
[11:28:55] Finished 'build-game' after 3.42 s
[11:28:55] Starting 'watch'...
[11:28:57] Finished 'watch' after 1.41 s
[11:28:57] Starting 'start'...
[11:28:57] Finished 'start' after 7.24 ms
```

Google Chrome should launch, showing you something like this (a standard game has more components active):

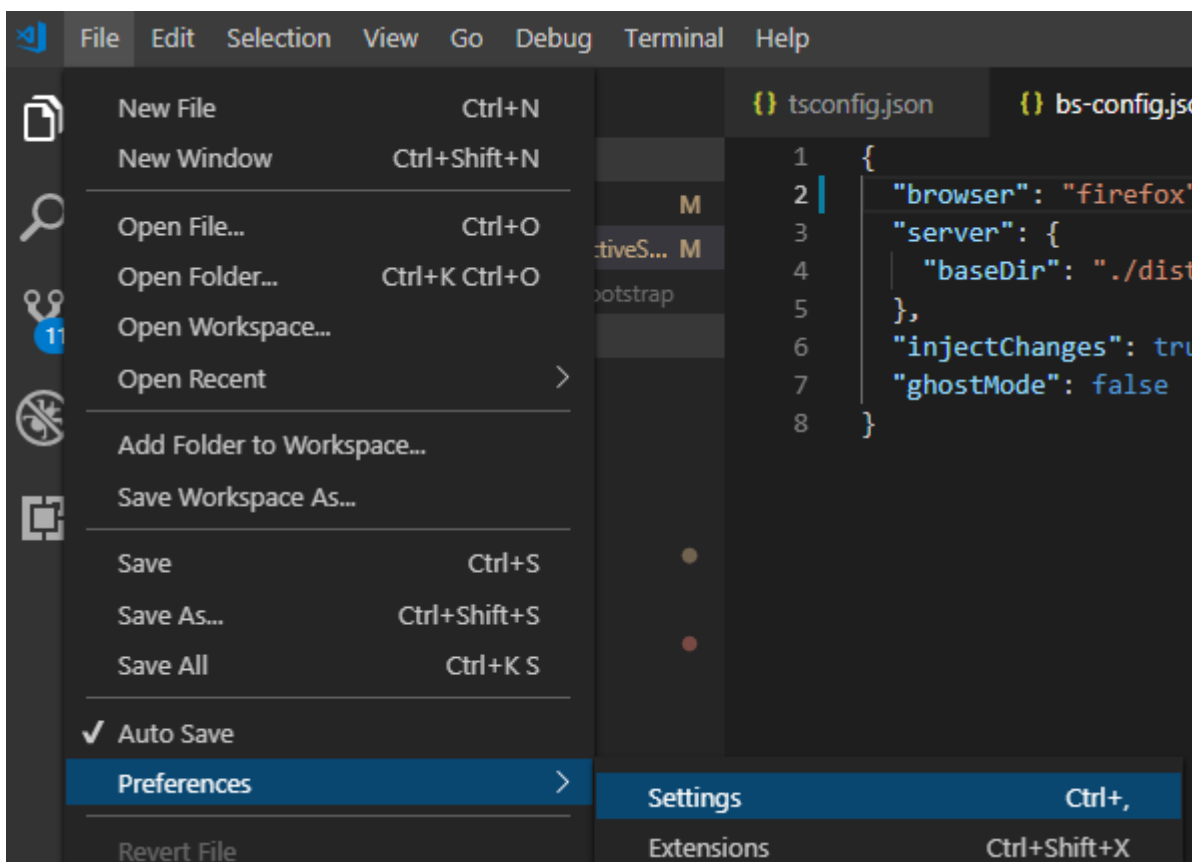


If you don't have Chrome, you can change the browser used in the '**bs-config.json**' file in your game folder to e.g. FireFox:

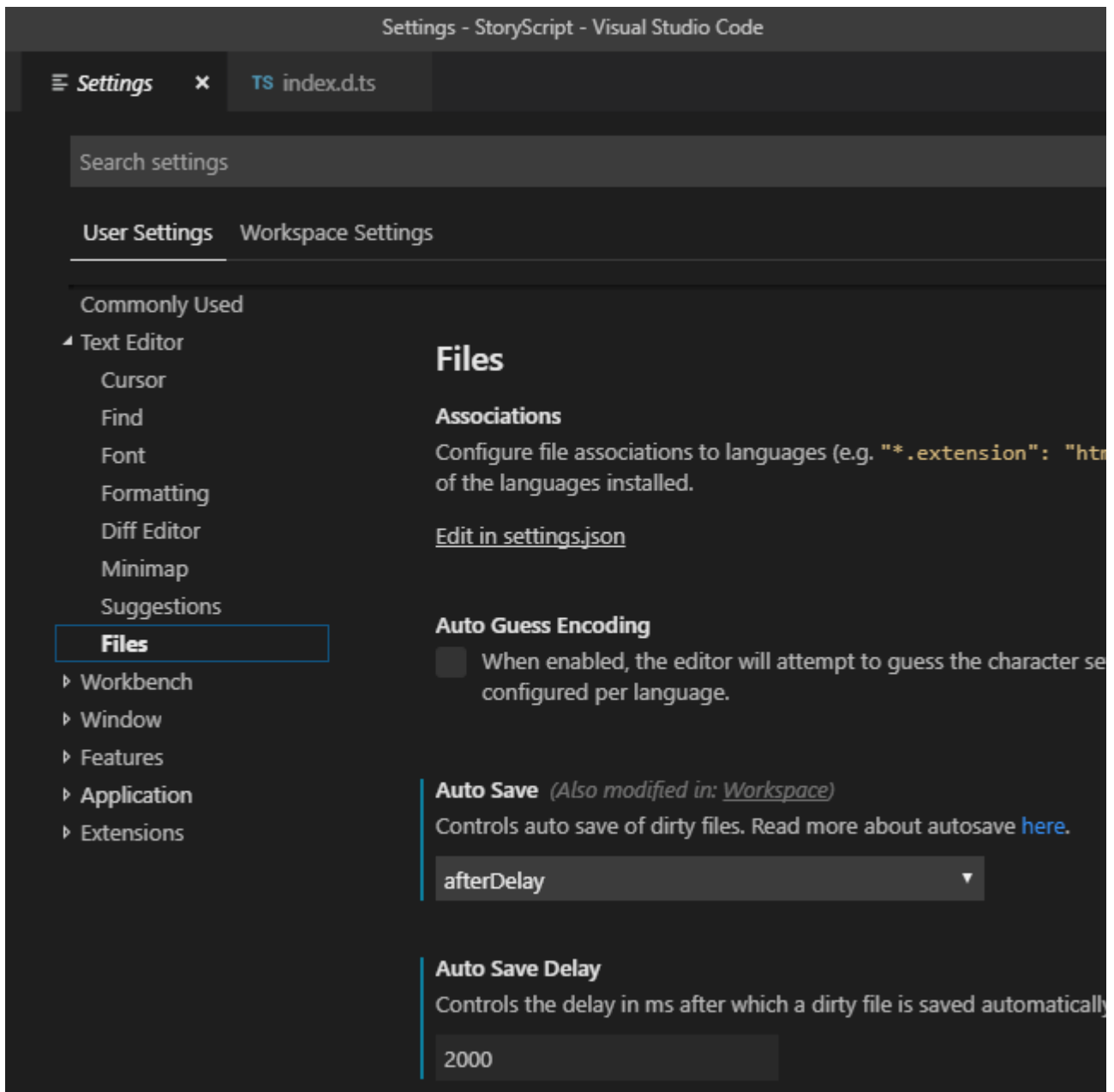


```
Help
{} tsconfig.json {} bs-config.json x TS
1 {
2   "browser": "firefox",
3   "server": {
4     "baseDir": "./dist"
5   },
6   "injectChanges": true,
7   "ghostMode": false
8 }
```

Congratulations, you are ready to begin creating your new game! Note that your browser will refresh whenever you save changes to your files (for css, the changes will be applied even without a refresh). You can enable automatic saving of files via the settings menu:



Change the contents of your 'User Settings' to match the screenshot below. You can of course change the **Auto Save Delay** to suit your preference:



Now, whenever a file is added, changed or deleted, the browser will refresh showing you the latest version of your game.

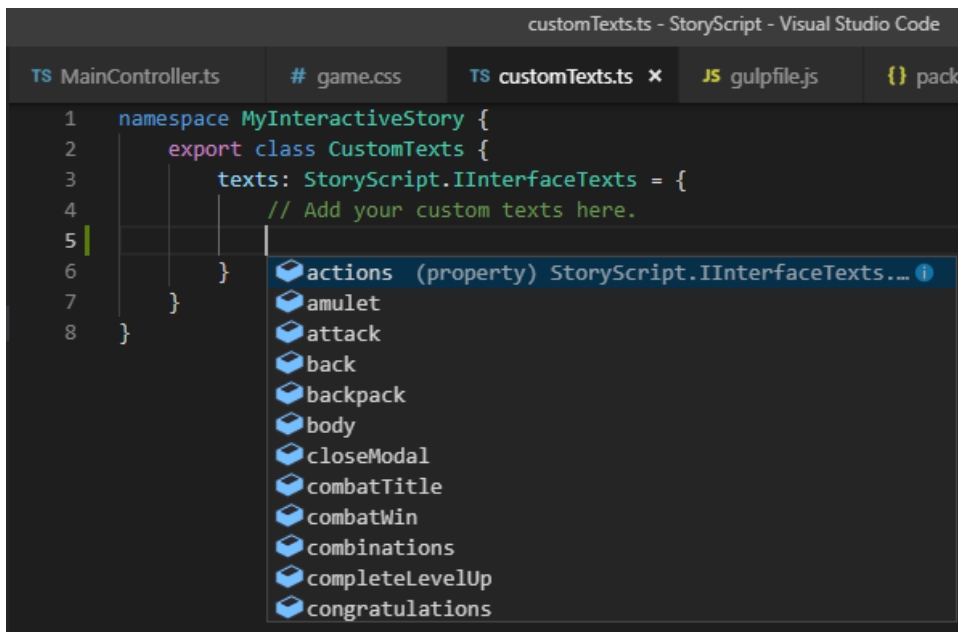
IMPORTANT NOTE: this is true for everything you need for interactive stories. All changes to css, html and resource files should be reflected immediately in the browser. If you move on to more dynamic games using standard mode, things are a bit more complicated, as explained in part 3.

.4 Customizing your user interface

With the structure of your game in place, let's start by changing the UI a bit to make it more specific to our game. I'll be showing you some basic ways in which you can do this using custom texts, html, css and resources. As StoryScript leverages basic browser technologies, you can use anything available in html and css to make it feel, look and sound as you want. So you can change font type, but also show pictures or play video.

We'll begin by changing some of the interface texts you are seeing. For example, the display name of your game is still '**Game template**', and maybe we want to show '**Chapter Start**' instead of '**You are at Start**' (Start is actually the name of the first chapter, we can give it a different name later).

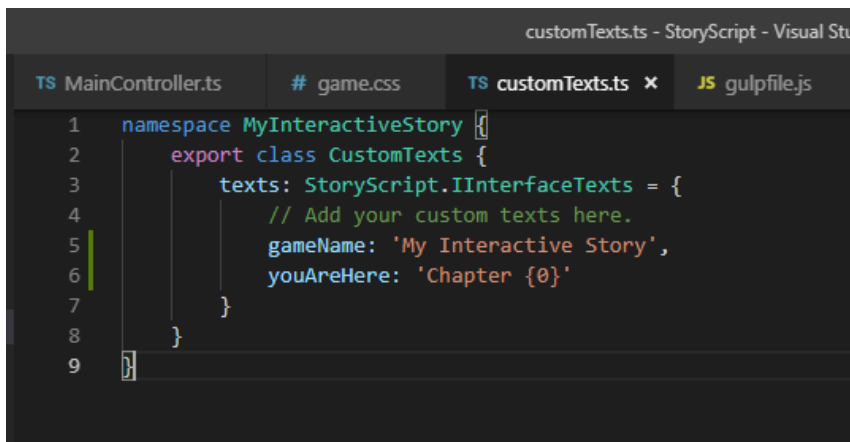
To change UI texts, go to the **customTexts.ts** file in your game folder. Place your cursor one line below where it says 'Add your custom texts here' and press **CONTROL-SPACE**. You will now see a list of all the texts that you can personalize:



```
1 namespace MyInteractiveStory {
2   export class CustomTexts {
3     texts: StoryScript.IInterfaceTexts = {
4       // Add your custom texts here.
5     }
6   }
7 }
8 }
```

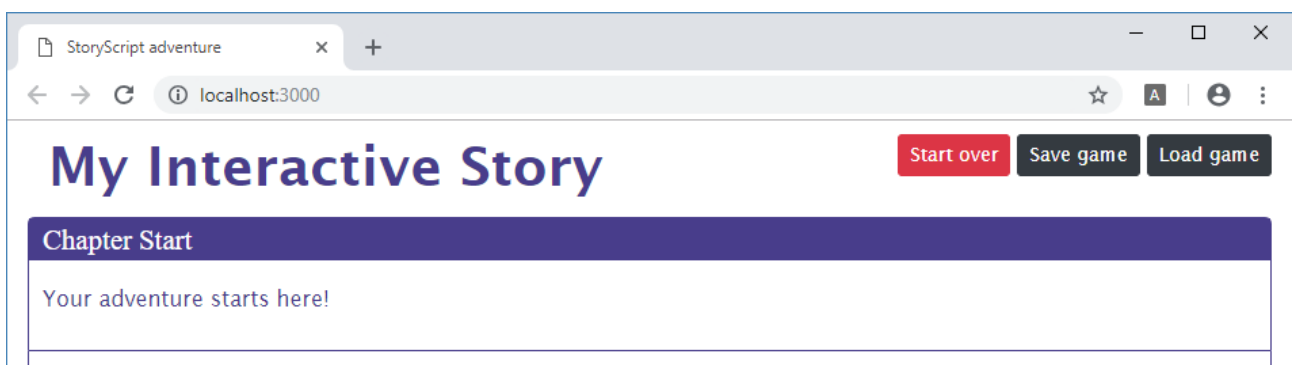
- actions (property) StoryScript.IInterfaceTexts...
- amulet
- attack
- back
- backpack
- body
- closeModal
- combatTitle
- combatWin
- combinations
- completeLevelUp
- congratulations

Change the game name and chapter texts by adding the following code. Note the placeholder for the chapter name:



```
1 namespace MyInteractiveStory {
2   export class CustomTexts {
3     texts: StoryScript.IInterfaceTexts = {
4       // Add your custom texts here.
5       gameName: 'My Interactive Story',
6       youAreHere: 'Chapter {0}'
7     }
8   }
9 }
```

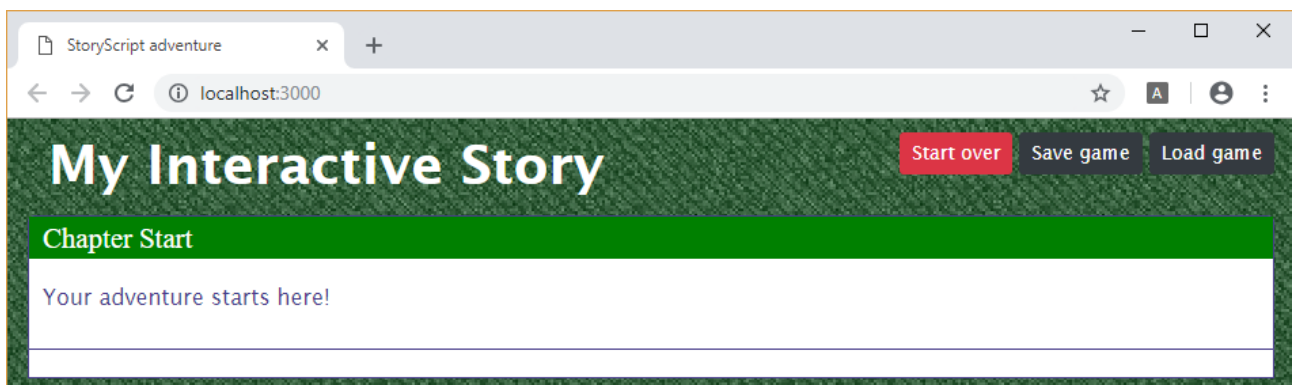
Your browser should now display the new texts.



With that done, let's do some simple styling changes to illustrate how you can use CSS and image resources to change your game's appearance. Open the **'game.css'** file in the ui folder and make some changes like below:

```
{} package.json # game.css x <> Start.html TS customTexts.ts
1 #action-log, #exploration-onground, #exploration-destin
2 |   display: none;
3 | }
4
5 #location {
6 |   margin-bottom: 0px;
7 | }
8
9 #exploration-destinations {
10 |   border-top: none;
11 |   border-radius: 0;
12 | }
13
14 body {
15 |   background: url('/resources/fec72f.png');
16 | }
17
18 h1 {
19 |   color: white;
20 | }
21
22 .box-container {
23 |   background-color: white;
24 | }
25
26 .box-title {
27 |   background-color: green;
28 | }
```

I added a background I randomly generated using <http://bg.siteorigin.com/> to the **resources** folder in my game directory and referenced it in the css file for use as background picture. I also changed some colors. Your browser will show you the changes without a refresh:

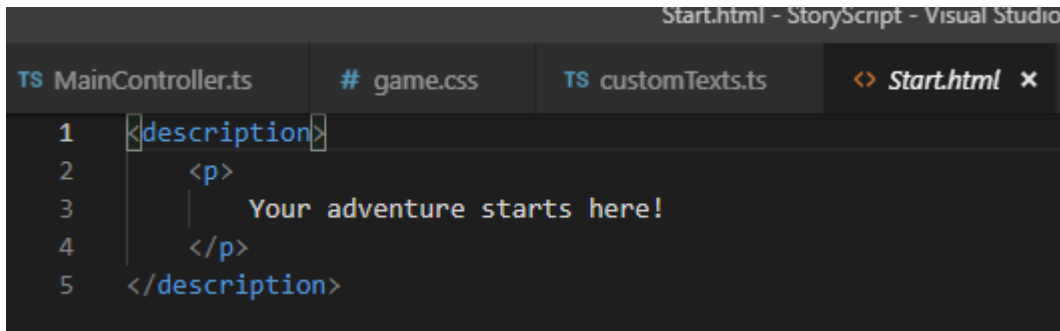


Enough on this for now. I'll reset the styling to the defaults for the rest of the tutorial.

Part 2. An interactive story

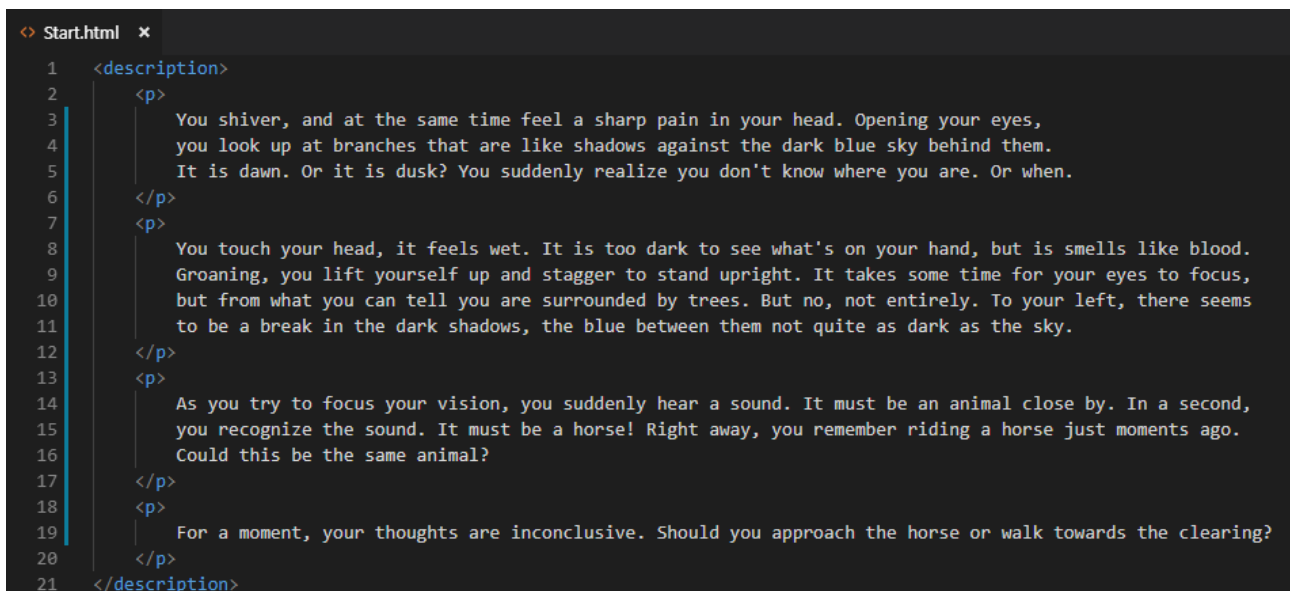
.5 Adding text and choices

Now that we have our UI set up, let's write the first chapter of our interactive novel and give the reader some choices. Just as with the UI, you can use everything a browser supports in your novel as you'll be using HTML markup to structure your content. But let's first focus on simple text. Open up the **Start.html** in the **locations** folder. It has the text you currently see:



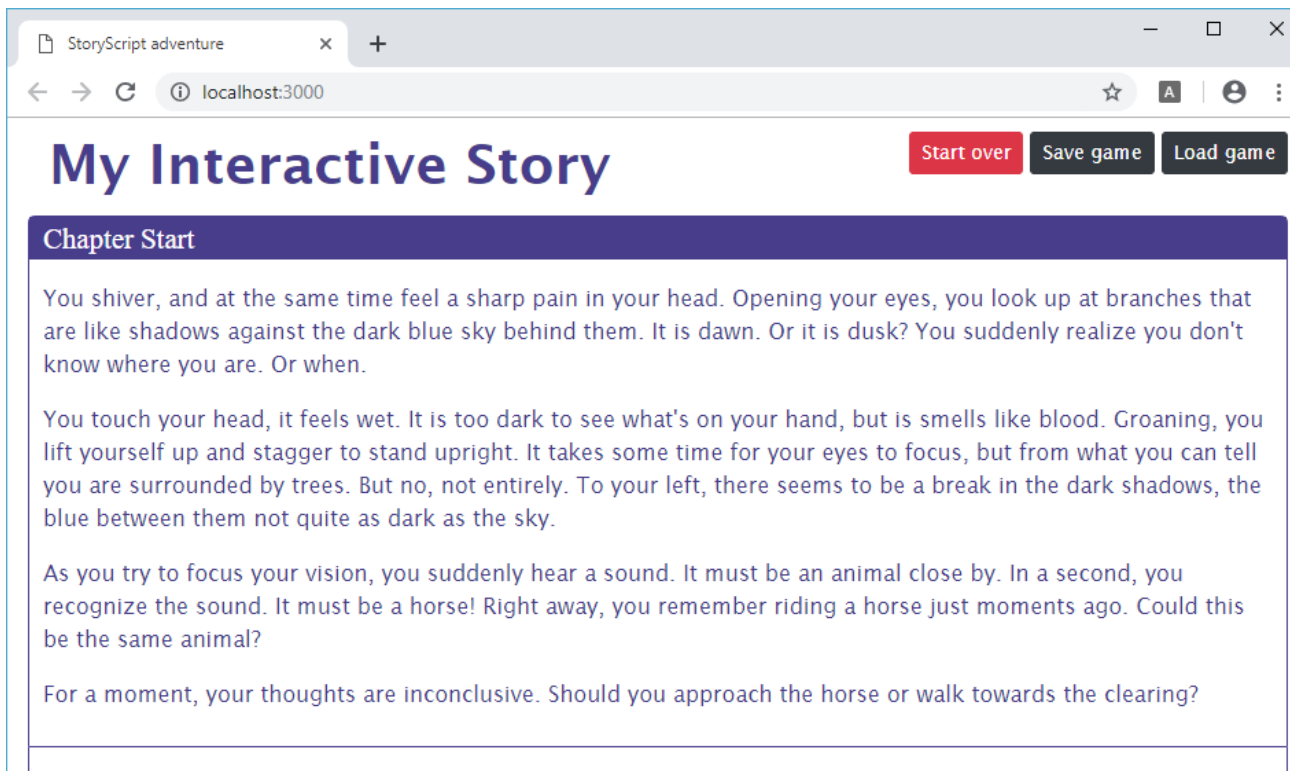
```
Start.html - StoryScript - Visual Studio
TS MainController.ts  # game.css  TS customTexts.ts  <> Start.html x
1  <description>
2      <p>
3          Your adventure starts here!
4      </p>
5  </description>
```

Let's change it to contain a few paragraphs:



```
<> Start.html x
1  <description>
2      <p>
3          You shiver, and at the same time feel a sharp pain in your head. Opening your eyes,
4          you look up at branches that are like shadows against the dark blue sky behind them.
5          It is dawn. Or it is dusk? You suddenly realize you don't know where you are. Or when.
6      </p>
7      <p>
8          You touch your head, it feels wet. It is too dark to see what's on your hand, but it smells like blood.
9          Groaning, you lift yourself up and stagger to stand upright. It takes some time for your eyes to focus,
10         but from what you can tell you are surrounded by trees. But no, not entirely. To your left, there seems
11         to be a break in the dark shadows, the blue between them not quite as dark as the sky.
12     </p>
13     <p>
14         As you try to focus your vision, you suddenly hear a sound. It must be an animal close by. In a second,
15         you recognize the sound. It must be a horse! Right away, you remember riding a horse just moments ago.
16         Could this be the same animal?
17     </p>
18     <p>
19         For a moment, your thoughts are inconclusive. Should you approach the horse or walk towards the clearing?
20     </p>
21 </description>
```

When you save, your browser refreshes to show you your new text:



Right. Now we want to change our chapter name, as Start isn't very appealing. For this we'll use the **displayname** attribute of the description of the Start.html file:

```
<> Start.html x TS DataService.ts TS LocationService.ts
1 <description displayname="A forest clearing">
2 <p>
```

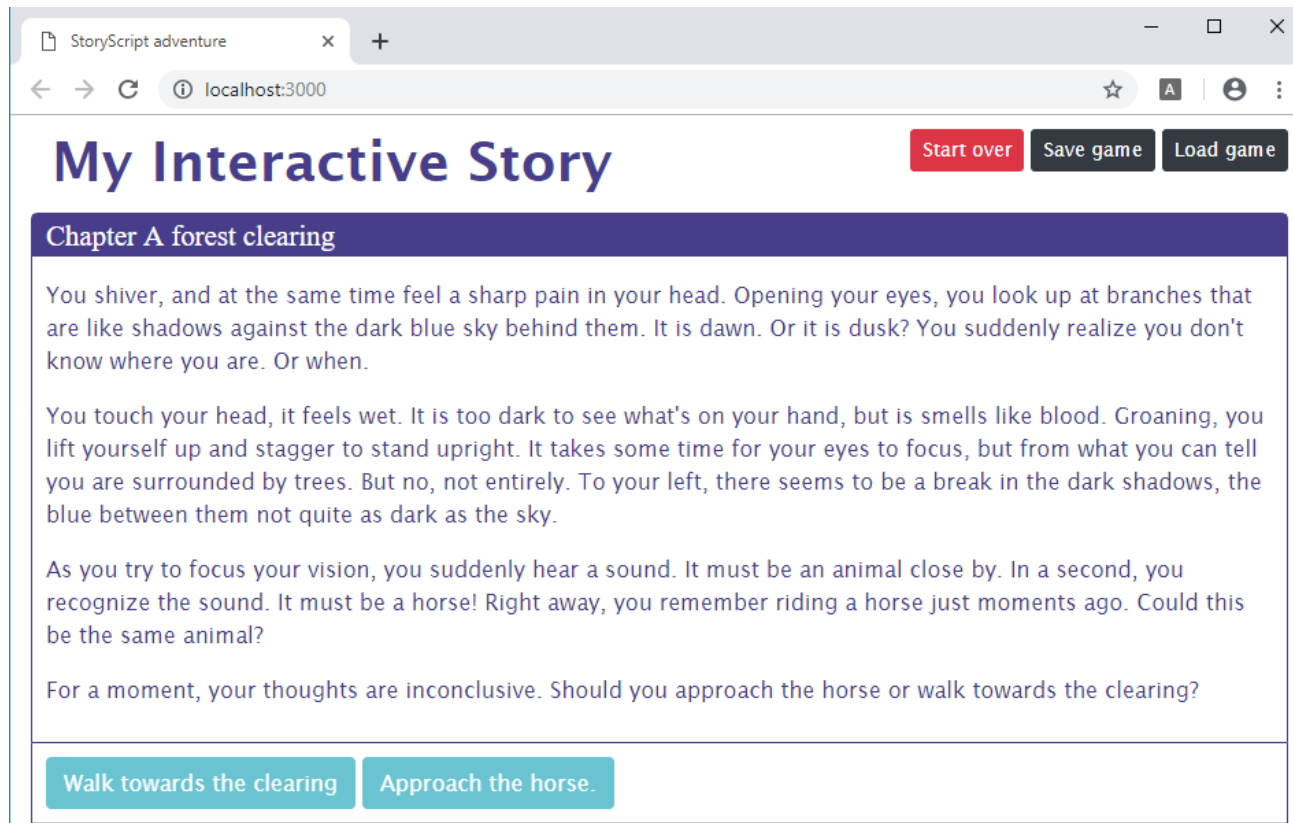
You should now see:



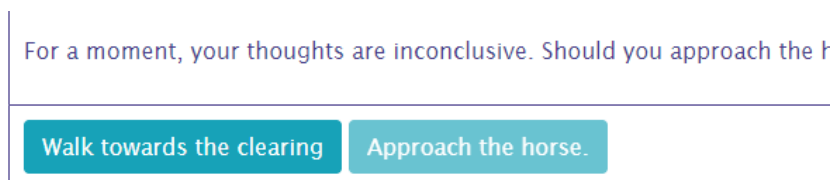
With the opening chapter name and text in place, we want the reader to be able to make a choice. For this, we add destinations to our HTML files. Each choice is represented by a destination, which leads to a new part of your story (a new HTML file). Currently, the story tells about a choice between two alternatives, so we need to add in two destinations, like this:

```
18 <p>
19 |   For a moment, your thoughts are inconclusive. Shou
20 </p>
21 </description>
22 <destination name="clearing">
23 |   Walk towards the clearing
24 </destination>
25 <destination name="horse">
26 |   Approach the horse.
27 </destination>
```

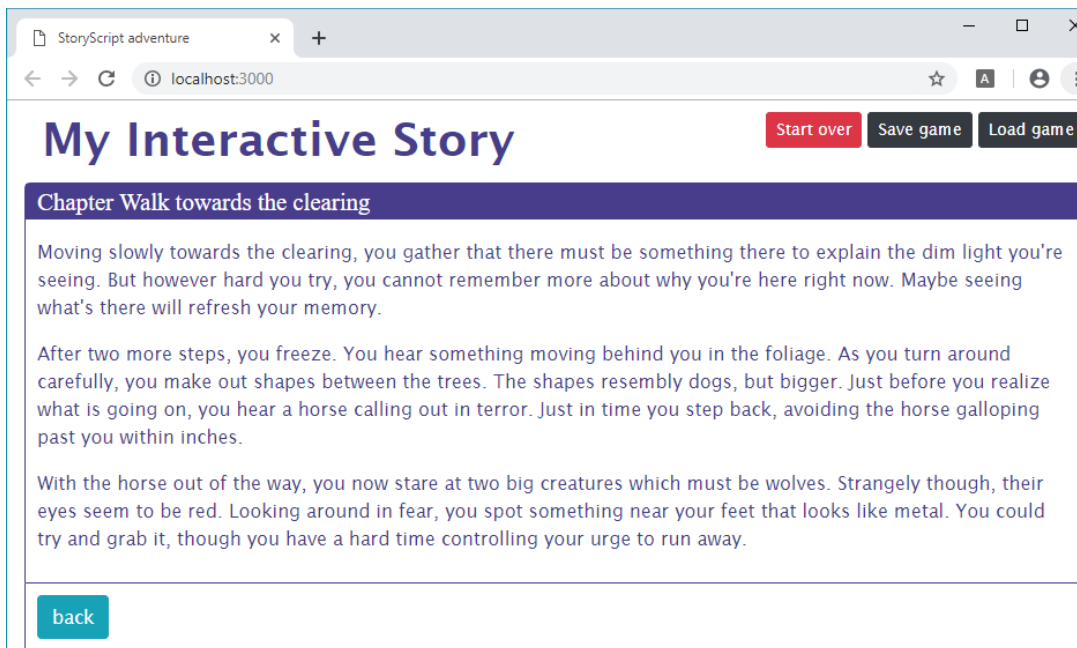
As soon as you add destinations this way, your browser will show them to you although at first they are unavailable:



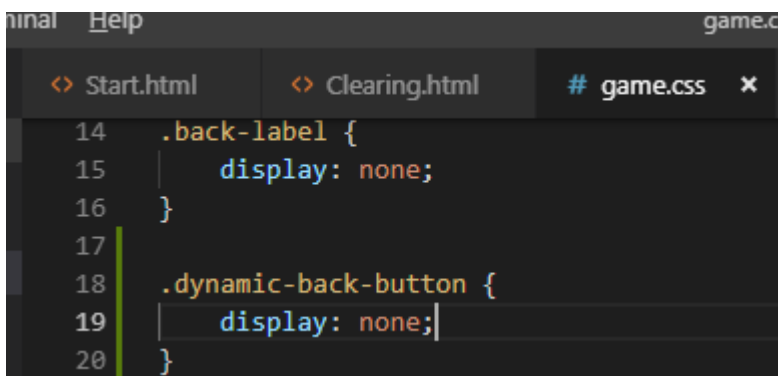
As you didn't add either a **clearing.html** or a **horse.html** file yet, there is nothing to continue reading so nothing to switch to. As soon as you add either of these files, the corresponding destination button will be activated:



Add a piece of story to the **clearing.html** and click the button. You now see the new piece of the story displayed:



Notice that a back button is available automatically to help you test your story more quickly. If you don't want it to show (like when the story is done), you can use some CSS to easily hide it:



You can also use the start over button to jump right back to the start of your game, and use the save game and load game buttons to store a game state and go right back to it. In an interactive story that may be not that interesting, but when you create more advanced game types this is definitely a nice thing to have.

.6 Adding media

When you have a story to tell, you can write it in StoryScript. But often, you may want to use more than just text. In books, pictures can help bring the story to life. And when you have the web browser at your disposal, you can also use audio and video. All of this is entirely optional, and creating media of these types is an art you may not master (I know I don't). But when you can create your own pictures or music, or when you have someone working with you that can, you can use those in StoryScript.

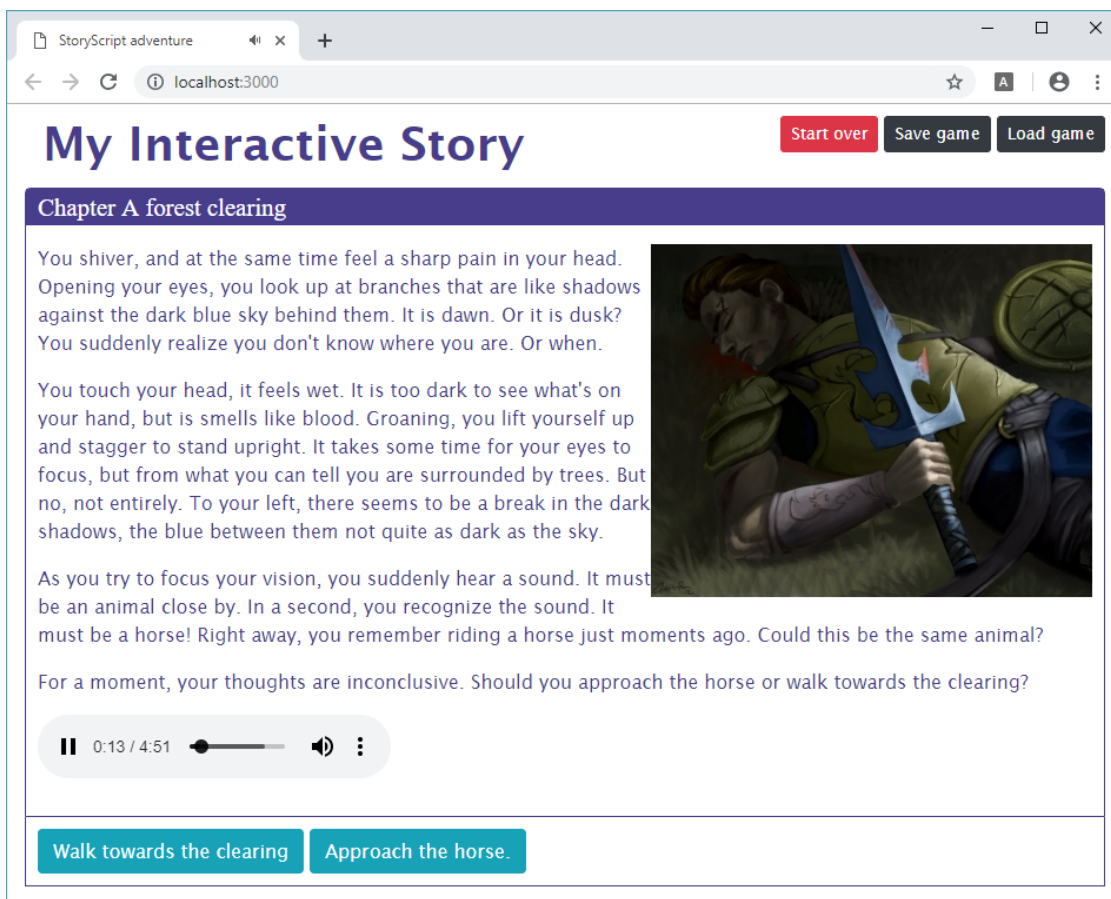
Basically, it is as simple as including pictures, audio and video in your descriptions with the usual HTML tags (`<audio>` and `<video>`). StoryScript will help to start playing them automatically, once or repeatedly (useful for background music). As an example, let's add a picture and some background music to our first chapter. I'm adding a picture and audio, as well as aligning the picture to the text, changing the **start.html** file like this like this:

```

1 <description displayname="A forest clearing">
2   <div class="float-right">
3     
4   </div>
5   <div>
6     <p>
7       You shiver, and at the same time feel a sharp pain in your head. Opening your eyes,
8       you look up at branches that are like shadows against the dark blue sky behind them.
9       It is dawn. Or it is dusk? You suddenly realize you don't know where you are. Or when.
10    </p>
11    <p>
12      You touch your head, it feels wet. It is too dark to see what's on your hand, but it smells like blood.
13      Groaning, you lift yourself up and stagger to stand upright. It takes some time for your eyes to focus,
14      but from what you can tell you are surrounded by trees. But no, not entirely. To your left, there seems
15      to be a break in the dark shadows, the blue between them not quite as dark as the sky.
16    </p>
17    <p>
18      As you try to focus your vision, you suddenly hear a sound. It must be an animal close by. In a second,
19      you recognize the sound. It must be a horse! Right away, you remember riding a horse just moments ago.
20      Could this be the same animal?
21    </p>
22    <p>
23      For a moment, your thoughts are inconclusive. Should you approach the horse or walk towards the clearing?
24    </p>
25  </div>
26  <div class="clearfix"></div>
27  <audio src="resources/Contemplate_the_stars.mp3" controls autoplay loop>
28 </description>
29 <destination name="clearing">

```

When your browser refreshes, you should now see this and hear the music play:



You can hide the audio controls if you want by just removing the controls attribute from the audio tag.

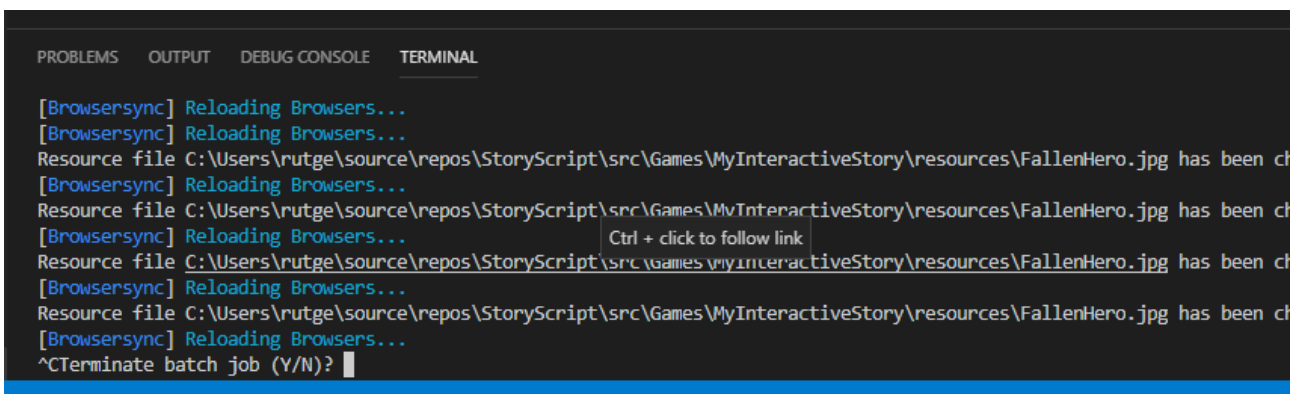
Part 3. Adventure gaming

.7 Setting up a standard game

In the early days of adventure gaming, classics such as King's Quest and Monkey Island defined the point & click adventure in which you wander the game world solving riddles by combining items, using them on characters or objects etc. Riddles like these can be created in StoryScript using combinations.

Working with combinations requires you to use a standard StoryScript game. While you could write an interactive story without any programming skills, creating an adventure game with combinations will require you to get your feet wet with some TypeScript programming. TypeScript is a superset of JavaScript, but that is not that important here. I've tried to make the StoryScript programming interface (Application Programming Interface or API) as simple to use as possible. That said, all programming requires some getting used to. If you stick with it, though, it gives you a lot of power to create unique games.


First, stop your interactive story game if it is still running by putting the focus in the console and pressing **CONTROL-C** and then **Y**:



```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL

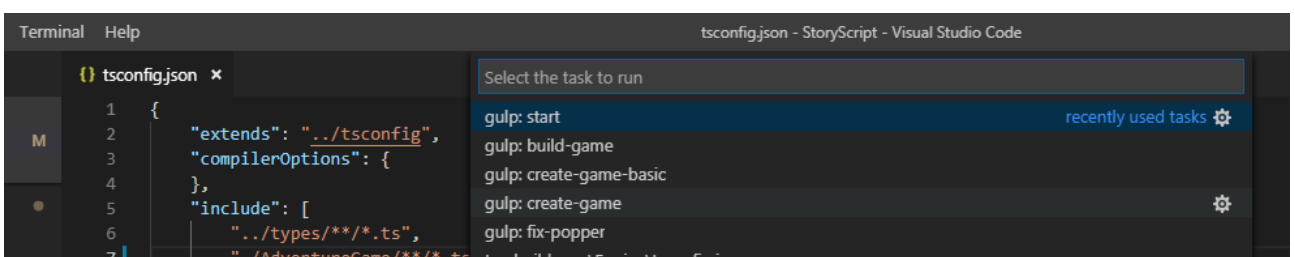
[Browsersync] Reloading Browsers...
[Browsersync] Reloading Browsers...
Resource file C:\Users\rutge\source\repos\StoryScript\src\Games\MyInteractiveStory\resources\FallenHero.jpg has been changed
[Browsersync] Reloading Browsers...
Resource file C:\Users\rutge\source\repos\StoryScript\src\Games\MyInteractiveStory\resources\FallenHero.jpg has been changed
[Browsersync] Reloading Browsers... Ctrl + click to follow link
Resource file C:\Users\rutge\source\repos\StoryScript\src\Games\MyInteractiveStory\resources\FallenHero.jpg has been changed
[Browsersync] Reloading Browsers...
Resource file C:\Users\rutge\source\repos\StoryScript\src\Games\MyInteractiveStory\resources\FallenHero.jpg has been changed
[Browsersync] Reloading Browsers...
^CTerminate batch job (Y/N)?
```

Create a new game called **AdventureGame** by changing the **tsconfig.json** file in the Games folder:



```
tsconfig.json
1 {
2   "extends": "../tsconfig",
3   "compilerOptions": {
4   },
5   "include": [
6     "../types/**/*.ts",
7     "../AdventureGame/**/*.ts"
8   ]
9 }
```

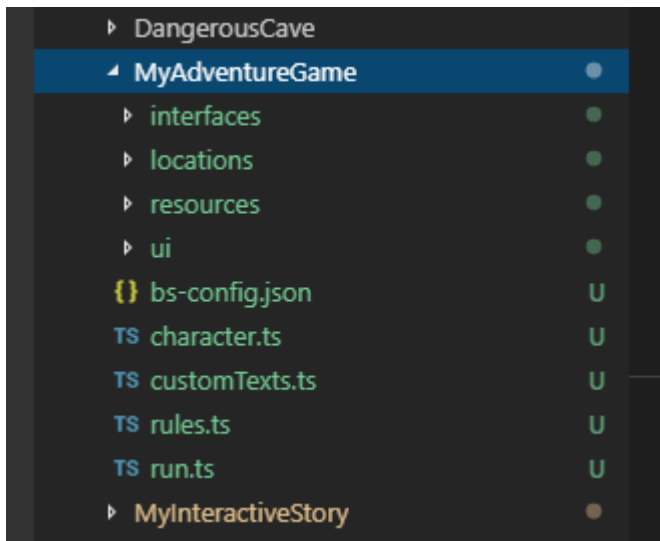
Then from the terminal menu, run the **gulp:create-game** task:



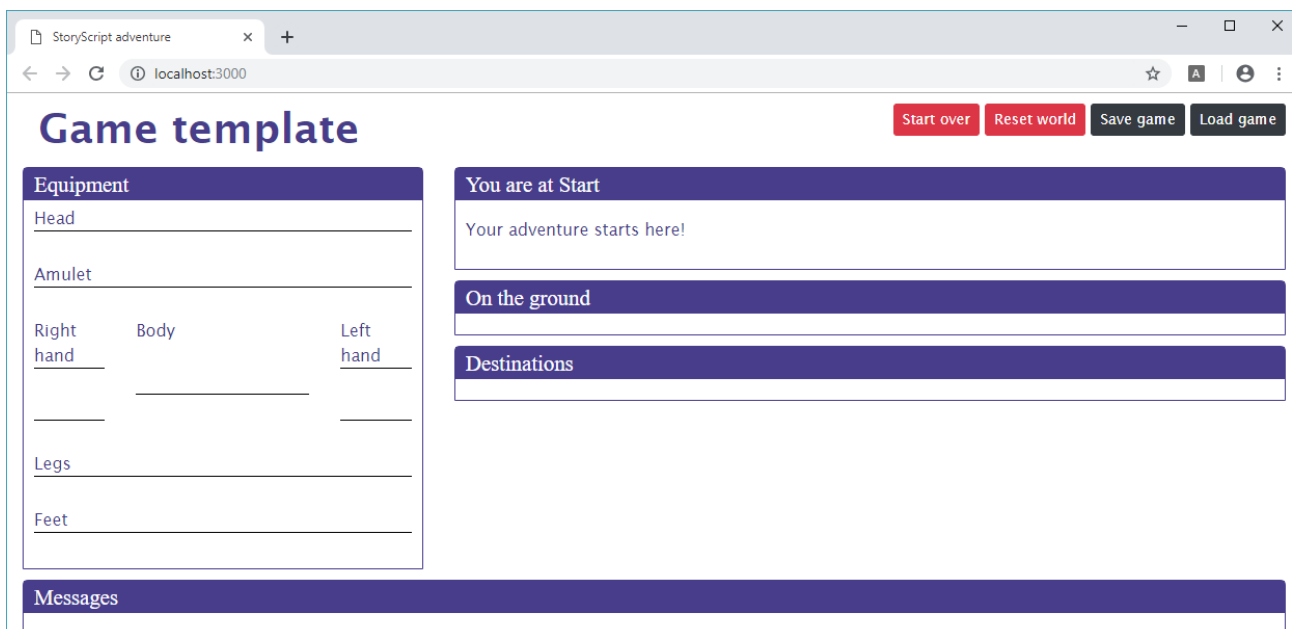
```
Terminal  Help  tsconfig.json - StoryScript - Visual Studio Code

Select the task to run
gulp: start
gulp: build-game
gulp: create-game-basic
gulp: create-game
gulp: fix-popper
tsc - build - src\Engine\tsconfig.json
```

Your new game is created, which has more files than a basic game:



When you build and run it (**CONTROL-SHIFT-B**) and your browser opens, press the **Start over** button. Your new game should look like this:



If it doesn't, press either the **Start over** or the **Reset world** button.

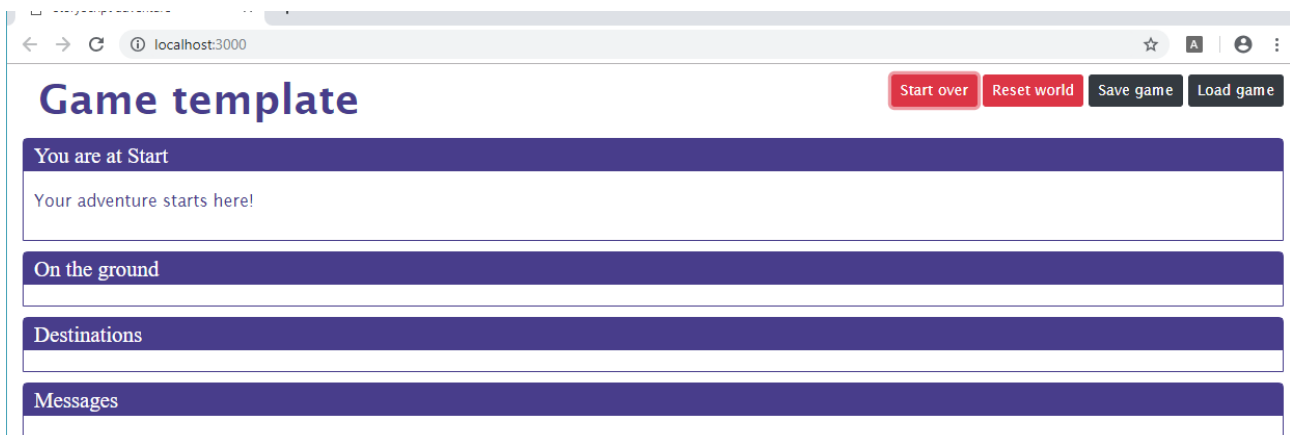
IMPORTANT NOTE: for standard games, it is no longer sufficient to just let the browser refresh to see all your changes. HTML and CSS changes should still be visible right away, but changes you make in **.ts** files (TypeScript files) will not show up immediately. This is because the game state is persisted between browser refreshes. It is one thing to display new text, styling or pictures right away, but resetting the game state on each refresh would be very annoying. That would mean that e.g. enemies and items are reset on each refresh. For changes made to your **.ts** files to show up, you need to press the **Reset world** button. From now on, when your browser refresh doesn't show you your latest changes, please press the **Reset world** button to make them appear.

Ok, now let's change the interface a bit to show just the parts we need for our adventure game. We don't need the equipment screen, we'll only be using the backpack (shown automatically when we find items). Simply open the **character.ts** file in your game folder and clear out the character properties:

```
tsconfig.json  JS gulpfile.js  TS character.ts x  TS LocationService.ts

1  namespace MyAdventureGame {
2      export class Character implements StoryScript.ICharacter {
3          name: string = "";
4          score: number = 0;
5          hitpoints: number = 10;
6          currentHitpoints: number = 10;
7          currency: number = 0;
8
9          // Add character properties here.
10
11         items: StoryScript.ICollection<IItem> = [];
12
13         equipment: {
14             // Remove the slots you don't want to use
15         };
16
17         constructor() {
18             this.equipment = {
19                 // Remove the slots you don't want to use
20             }
21         }
22     }
23 }
```

When the browser refreshes, press the **Start over** button so the character is refreshed and the equipment part goes away:



Ok, we'll work with these elements for now. Time to start defining our combinations.

.8 Using combinations

Defining what combinations should be available in the game is done in your **rules.ts** file. Let's define 'Use', 'Touch' and 'Look at' for this example. First, create a new **constants.ts** file with these contents, so we define our combinations in one place:

```

1 namespace MyAdventureGame {
2     export class Constants {
3         static USE: string = 'Use';
4         static TOUCH: string = 'Touch';
5         static LOOKAT: string = 'Look';
6     }
7 }

```

We can use these definitions to create the combinations in our **rules.ts** file like this:

```

1 namespace MyAdventureGame {
2     export class Rules implements StoryScript.IRules {
3         getCombinationActions = (): StoryScript.ICombinationAction[] => {
4             return [
5                 {
6                     text: Constants.USE,
7                     preposition: 'on'
8                 },
9                 {
10                    text: Constants.TOUCH,
11                    requiresTool: false
12                },
13                {
14                    text: Constants.LOOKAT,
15                    preposition: 'at',
16                    requiresTool: false,
17                    failText: (game, target, tool): string => {
18                        return 'You look at the ' + target.name + '. There is nothing special about it';
19                    }
20                }
21            ];
22        }
23
24        getSheetAttributes = () => {

```

There are a few things to note here:

- You can see that the combinations have an action text (e.g. 'Use', 'Look') and an optional preposition ('on' or 'at'). In StoryScript, these will be used to create combinations such as 'Use pen on paper' or 'Look at gate'.
- As some combinations require two parts (we'll call these parts the **tool** and the **target**, e.g. Use requires both but Look does not (of course, you could also use binoculars to get a better look, but you get the idea)) you should specify when one does not require a tool.
- You can specify a default text displayed when a combination is tried that doesn't work in the **customTexts.ts** file. There are two templates you can override, one for combinations requiring a tool and one for those who don't. The numbers between the curly brackets are placeholders, and will be replaced at runtime:

noCombination: "You {2} the {0} {3} the {1}. Nothing happens."

1. The 'tool' for the combination
2. The 'target' for the combination
3. The combination name (Use, Look)
4. The preposition (on, at)

For example: “You use the pen on the paper”.

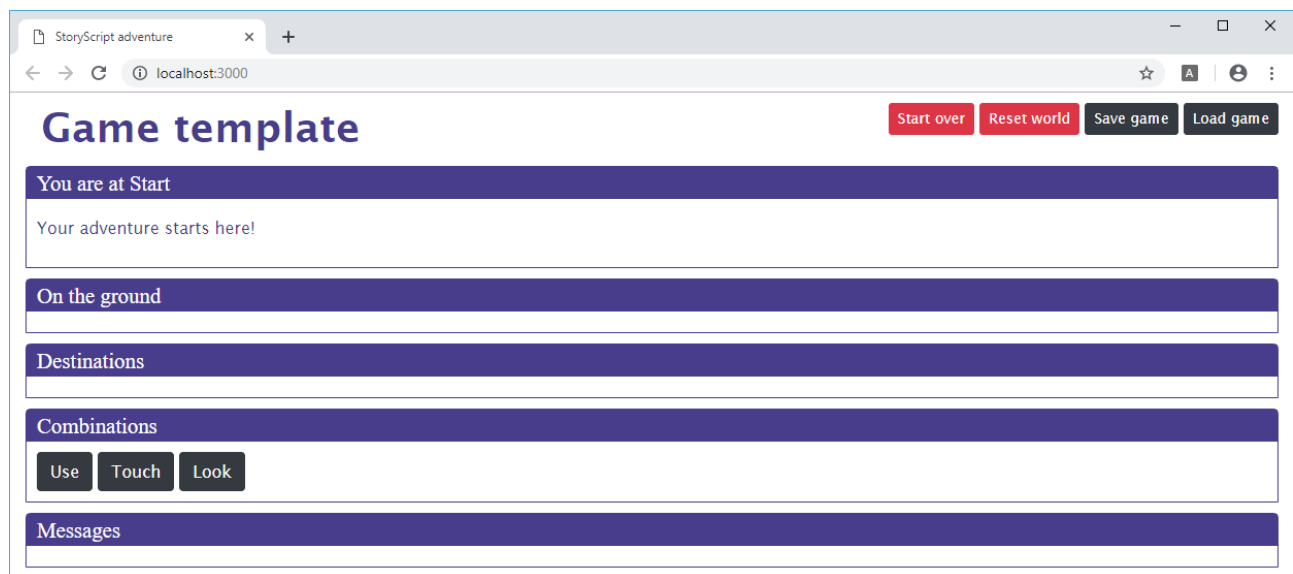
noCombinationNoTarget: "You {1} {2} the {0}. Nothing happens."

1. The ‘target’ for the combination
2. The combination name (Use, Look)
3. The preposition (on, at)

For example: “You look at the gate”.

If you want something more specific, you can specify a fail text per combination, as shown above. You can be even more specific when you know what combination is tried on what object, which will be discussed in a bit.

With your combinations defined, they should show up in your browser:



For our combinations to do anything, we need tools and targets for them. These can be any of the following StoryScript entities:

- Features
- Items
- Enemies and Persons
- Barriers

In this part of the tutorial, we’ll focus on features and items. Enemies, persons and barriers will be discussed in part 4.

In StoryScript, you can work with combinations in two ways, which you can mix if you want to. The first is text-based, using text descriptions for your locations and features. You can also go picture-based, which means you use one or more pictures to make your world come to life. We’ll start with a text example, and then show how you can build the example using pictures as well.

To create a location players can interact with, we’ll create some features. Features are noteworthy elements of a location that a player can interact with. Let’s start with a fountain as an example, one found in a forest clearing. Go to your **Start.html** and change the description element as shown below. Also add the feature element:

```

1  <description>
2  |   <p>
3  |       You stand at the edge of a forest clearing. Tall trees border it on all sides,
4  |       with thick undergrowth making the clearing hard to get to. In the center of the
5  |       clearing is a fountain.
6  |   </p>
7  </description>
8  <feature name="fountain">
9  |   A fountain with a six-sided base.
10 </feature>

```

Second, open the **Start.ts** file and change it like this:

```

1  namespace MyAdventureGame.Locations {
2  |   export function Start() {
3  |       |   return Location({
4  |       |       |   name: 'Start',
5  |       |       |   features: [
6  |       |       |       {
7  |       |       |           |   name: 'Fountain',
8  |       |       |           |   combinations: {
9  |       |       |           |       combine: [
10 |       |       |           |           {
11 |       |       |           |               |   type: Constants.LOOKAT,
12 |       |       |           |               |   match: (game, target, tool): string => {
13 |       |       |           |                   |   return 'You look at the fountain water. It is very clear and reflects the forest.';
14 |       |       |           |               }
15 |       |       |           |           }
16 |       |       |           |       ]
17 |       |       |       }
18 |       |       ]
19 |       }
20 |   };
21 }
22

```

When your browser refreshes, press **Reset world** or **Start over** to see the fountain feature. Press the Look combination button and then the fountain feature to see your match text displayed:

You are at Start

You stand at the edge of a forest clearing. Tall trees border it on all sides, with thick undergrowth making the clearing hard to get to. In the center of the clearing is a fountain.

- A fountain with a six-sided base.

On the ground

Destinations

Combinations

Use Touch Look

Look at

Combinations

Use Touch Look

Look at Fountain: You look at the fountain water. It is very clear and reflects the forest.

When instead of Look you use Touch, you should see the default fail text as you haven't specified any combination for the fountain feature and Touch:

Combinations

Use

Touch

Look

Touch Fountain: You Touch the Fountain. Nothing happens.

Ok, let's make the Touch action do something as well. When the player walks towards the fountain and touches the water, he'll hear a soft muttering coming from the undergrowth at the edge of the clearing. This should give him the opportunity to go and check out that spot.

For this to work, we need to add a couple of things. Start with adding two files for a new location called Passage, so a **Passage.html** and a **Passage.ts** file. The html file can be empty. To the ts file, add the following:

```
tsconfig.json  TS start.ts  TS passage.ts x
1  namespace MyAdventureGame.Locations {
2      export function Passage() {
3          return Location({
4              name: 'A passage in the undergrowth',
5          });
6      }
7  }
```

With the new location added, we can make it available when the Touch combination on the fountain is triggered with a bit more code to the Start.ts file:

```
combinations: {
  combine: [
    {
      type: Constants.LOOKAT,
      match: (game, target, tool): string => {
        return 'You look at the fountain water. It is very clear and reflects the forest.';
      }
    },
    {
      type: Constants.TOUCH,
      match: (game, target, tool): string => {
        if (game.currentLocation.destinations.length == 0) {
          game.currentLocation.destinations.push({
            name: 'Crawl though the undergrowth',
            target: Locations.Passage
          });
          return `You walk towards the fountain and touch the fountain water.
          It is a little cold. When you pull back your hand, you hear a soft
          muttering. It is coming from a small passage in the undergrowth.`;
        }
        else {
          return 'The fountain water is pleasant to the touch.';
        }
      }
    }
  ]
}
```

Note how I used the backtick (``) to break up the long text across multiple lines.

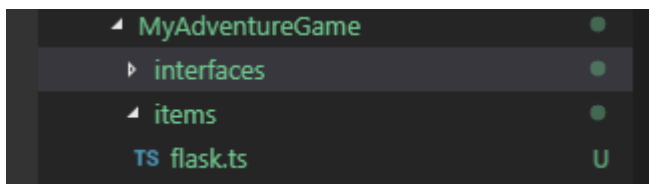
Resetting the world and touching the fountain, you should see this:

On the ground	
Destinations	
Crawl through the undergrowth	
Combinations	
<div>Use</div> <div>Touch</div> <div>Look</div>	Touch Fountain: You walk towards the fountain and touch the fountain water. It is a little cold. When you pull back your hand, you hear a soft muttering. It is coming from a small passage in the undergrowth.

Touching the fountain, the player unlocked a new destination to travel to! In the code, I also made sure that nothing happens the second time you touch the water using the **if/else** block. If you touch the water again, you'll just see a message displayed.

With these simple interactions that do not use a tool in place, let's create a combination with the Use command to show an example of a combination that does use a tool. As a simple illustration, let's create a new feature for the Passage location with a Look combination that will give the player an item.

First, add a folder called items to the game folder and a file called **flask.ts** inside of it:



Add this code to the flask.ts file:

```
tsconfig.json  TS start.ts  TS passage.ts  TS flask.ts  x
1  namespace MyAdventureGame.Items {
2      export function Flask() {
3          return Item({
4              name: 'Flask',
5              equipmentType: StoryScript.EquipmentType.Miscellaneous
6          });
7      }
8  }
```

Now we have a flask item in the game that we can use.

Modify the **Passage.html** file like this:

```
TS passage.ts  TS flask.ts  TS start.ts  TS gameService.ts  <> Passage.html  TS LocationSe
1  <description>
2      The small tunnel in the undergrowth is hard to get through. On the other end
3      the trees are close together, blocking most of the sunlight.
4  </description>
5  <feature name="woundedwarrior" displayname="Wounded warrior">
6      A gravely injured warrior lies on the ground here.
7  </feature>
```

Note the displayname attribute to show something more readable in the combination text. Then change the **Passage.ts** file like this:

```

name: 'A passage in the undergrowth',
destinations: [
  {
    name: 'Back to the fountain',
    target: Locations.Start
  }
],
features: [
  {
    name: 'Wounded warrior',
    combinations: {
      failText: 'That won\'t help him.',
      combine: [
        {
          type: Constants.LOOKAT,
          match: (game, target, tool): string => {
            if (!game.character.items.get(Items.Flask)) {
              game.character.items.push(Items.Flask);
              return `Looking at the warrior, you see a flask on his belt.
                carefully, you remove it.`;
            }
            else {
              return 'You see nothing else that might help.';
            }
          }
        }
      ]
    }
  }
]

```

Note that I added a destination to be able to return to the fountain from here. Reset your world and go to the Passage location. Look at the warrior. You should now receive a flask:

Game template

Start over Reset world Save game Load game

Backpack

Flask Drop

You are at A passage in the undergrowth

The small tunnel in the undergrowth is hard to get through. On the other end the trees are close together, blocking most of the sunlight.

- A gravely injured warrior lies on the ground here.

On the ground

Destinations

Back to the fountain

Combinations

Use

Touch

Look

Look at Wounded warrior: Looking at the warrior, you see a flask on his belt. carefully, you remove it.

Great, we now have an item to use. We'll let the player fill the flask with fountain water to give to the warrior. Add a new item for the fountain water, a water.ts file with these contents:

```

1 namespace MyAdventureGame.Items {
2     export function Water() {
3         return Item({
4             name: 'Fountain water',
5             equipmentType: StoryScript.EquipmentType.Miscellaneous
6         });
7     }
8 }

```

Then, add a new combination to the **start.ts** file:

```

},
{
    type: Constants.USE,
    tool: Items.Flask,
    match: (game, target, tool): string => {
        var flask = game.character.items.get(Items.Flask);

        if (flask) {
            game.character.items.remove(flask);
            game.character.items.push(Items.Water);
            return `You fill the flask with the clear fountain water.`;
        }
        else {
            return 'The fountain water is pleasant to the touch.';
        }
    }
}
}

```

Try the use combination with the flask and the fountain. You should see the Flask item replaced by a Fountain water item:

Game template

Backpack

Flask

You are at Start

You stand at the edge of a forest clearing. Tall trees border it on all sides, with thick undergrowth making the clearing hard to get to. In the center of the clearing is a fountain.

- A fountain with a six-sided base.

On the ground

Destinations

Crawl through the undergrowth

Combinations

Use

Touch

Look

Use Flask on

Start over

Reset world

Save game

Load game

Game template

[Start over](#)[Reset world](#)[S](#)

Browsersync: connected

Backpack

Fountain water [Drop](#)

You are at Start

You stand at the edge of a forest clearing. Tall trees border it on all sides, with thick undergrowth making the clearing hard to get to. In the center of the clearing is a fountain.

- A fountain with a six-sided base.

On the ground

Destinations

[Crawl through the undergrowth](#)

Combinations

[Use](#)[Touch](#)[Look](#)

Use Flask on Fountain: You fill the flask with the clear fountain water.

Note that the order in which you select the tool and a target for combinations that require both matters in most cases. Only when using two items together will a combination be resolved irrespective of whether the tool or the target was selected first. Let's demonstrate this by adding one more item to wrap up before moving on to using combinations in a visual way.

Add a new file in your items folder called **herbs.ts** and add this code:

```
tsconfig.json TS start.ts TS passage.ts TS herbs.ts x
1 namespace MyAdventureGame.Items {
2     export function Herbs() {
3         return Item({
4             name: 'Herbs',
5             equipmentType: StoryScript.EquipmentType.Miscellaneous
6         });
7     }
8 }
```

Add one more item file called **healingPotion.ts**:

```
tsconfig.json TS start.ts TS passage.ts TS healingPotion.ts x
1 namespace MyAdventureGame.Items {
2     export function HealingPotion() {
3         return Item({
4             name: 'Healing potion',
5             equipmentType: StoryScript.EquipmentType.Miscellaneous
6         });
7     }
8 }
```

Add the herbs to the **Passage** location like this. Note the brackets after the item name, these are needed to instantiate a new herbs item for the location (there is a long technical history why you need them here and not when e.g. adding an item using push. You can also use the brackets when you're pushing a new item, but it doesn't make sense when removing one):

```

destinations: [
  {
    name: 'Back to the fountain',
    target: Locations.Start
  }
],
items: [
  Items.Herbs()
],
features: [

```

Then, add this combination to the **water.ts** file:

```

name: 'Fountain water',
equipmentType: StoryScript.EquipmentType.Miscellaneous,
combinations: {
  failText: 'You can\'t use the water like that',
  combine: [
    {
      type: Constants.USE,
      tool: Items.Herbs,
      match: (game, target, tool): string => {
        game.character.items.remove(Items.Water);
        game.character.items.remove(Items.Herbs);
        game.character.items.push(Items.HealingPotion);
        return `You cut the herbs into small pieces and add them to the water.
                This potion should help to heal wounds.`;
      }
    }
  ]
}

```

Start over. When you now go to the Passage location, you'll find the herbs on the ground there:

You are at A passage in the undergrowth

The small tunnel in the undergrowth is hard to get through.

- A gravely injured warrior lies on the ground here.

On the ground

Herbs

Get the flask, fill it with water and then use the Herbs on the Fountain water to create the Healing potion. You can try both ways, the order shouldn't matter:

Backpack

Healing potion
Drop

You are at Start

You stand at the edge of a fo clearing is a fountain.

- A fountain with a six-sid

On the ground

Destinations

Crawl though the undergro

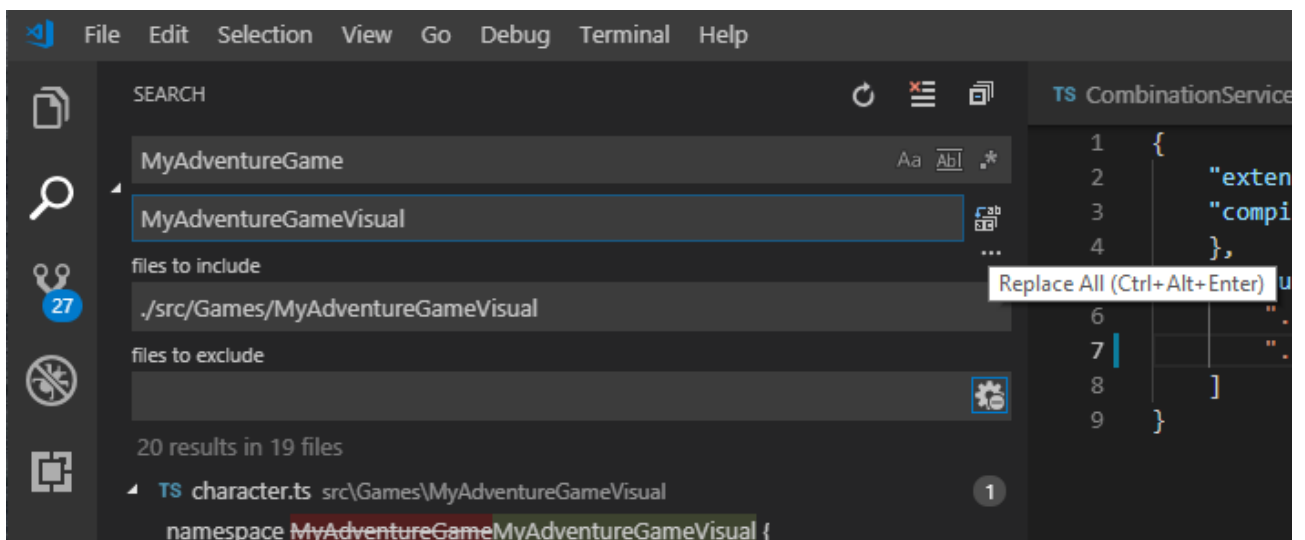
Combinations

Use
Touch
Look

Use Herbs on Fountain water: You cut the herbs

.9 Visual combinations

With the elements of tutorial of chapter 8 in place, we can now look at how you can work with a more visual representation of your world using combinations. Stop your current game (**CONTROL-C** in the terminal window) and copy the game, calling the copy `MyAdventureGameVisual`. Select the new folder and press **CONTROL-SHIFT-H**. Replace `MyAdventureGame` with `MyAdventureGameVisual` in all folder files:



Update the `tsconfig.js` file:

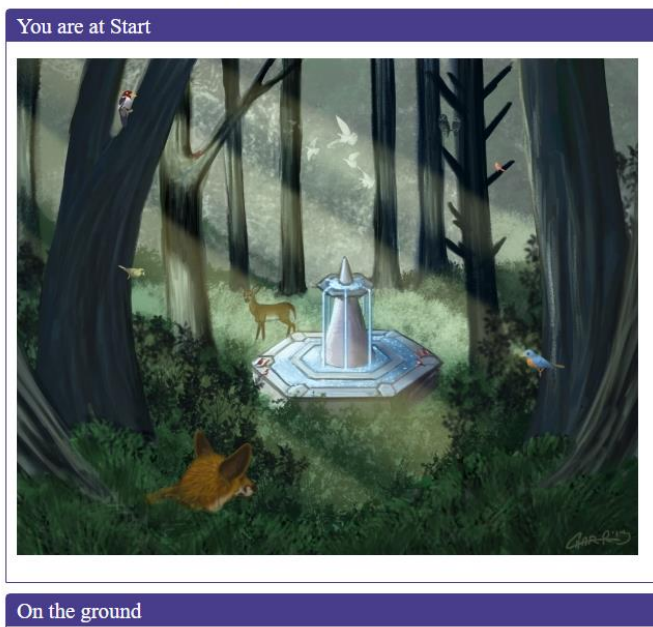
```
• tsconfig.json - StoryS...
TS CombinationService.ts {} tsconfig.json •
1 {
2   "extends": "../tsconfig",
3   "compilerOptions": {
4   },
5   "include": [
6     "../types/**/*.ts",
7     "../MyAdventureGameVisual/**/*.ts"
8   ]
9 }
```

Then build and start the new game (**CONTROL-SHIFT-B**). Press the Start over button after the browser reloads if you don't see the game screen that we created in chapter 8.

Ok. With the copy in place, we can start replace text elements with visual elements. First, I remove the description text and feature from the **start.html** file and add a picture instead, like this:

```
Start.html - StoryScr...
{} tsconfig.json <> Start.html x
1 <description>
2   
3 </description>
```

The fountain.jpg I add to the resources folder. My browser now shows this:



To make the image interactive, I use the ImageMap html functionality. I can create an image map using a website like <https://www.image-map.net/>. Just upload an image and create some areas for your picture:



Active	Shape	Link	Title	Target
<input type="radio"/>	Poly	Link	Title	--- <input type="button" value="x"/>
<input checked="" type="radio"/>	Rect	Link	Title	--- <input type="button" value="x"/>

[+ Add New Area](#)

[Show Me The Code!](#)

For now, I created two, one for the fountain and one for the passage through the undergrowth. Press the ‘Show Me The Code!’ button, right click the code shown and select all. Copy the code to a temporary location (e.g. notepad), and use the fountain polygon to set up the first visual feature in the start.html file like this (replace the existing contents. Note that not all the area code is shown for readability):

```

tsconfig.json  <> Start.html x
src ▸ Games ▸ MyAdventureGameVisual ▸ locations ▸ <> Start.html ▸ visual-features
1  <visual-features img="fountain.jpg">
2    <area name="fountain" coords="292,218,289,259,269,261,229,292,"
3  </visual-features>

```

In your browser, you should now see a pointer when you move the mouse over the areas you defined for your picture. And you should be able to interact with the fountain again, looking at it and touching it.

We used the Touch combination to add a new destination to the location. Let’s change that a bit by making the second area we defined do something. First, we’ll create a stand-alone feature, which is a bit easier to work with than one attached to a location. Add a new folder called **features** and add a **passage.ts** file to it. Enter this code, using the coordinates and type of the second, rectangular area we created with the image map tool:

```

src ▸ Games ▸ MyAdventureGameVisual ▸ features ▸ TS passage.ts ▸ {} MyAdventureGameVisual.Features
1  namespace MyAdventureGameVisual.Features {
2      export function Passage() {
3          return Feature({
4              name: 'Passage',
5              coords: "492,241,464,196",
6              shape: "rect",
7              combinations: {
8                  combine: [
9                      {
10                         combinationType: Constants.WALK,
11                         match: (game, target, tool): string => {
12                             game.changeLocation(Locations.Passage);
13                             return 'You crawl through the undergrowth...';
14                         }
15                     },
16                 ]
17             }
18         });
19     }
20 }

```

As you can see, I added a new combination type, Walk. Add it to your **rules.ts** like this:

```

    requiresTool: false,
    failText: (game, target, tool): string => {
        return 'You look at the ' + target.name + '. There is nothing special about it';
    }
},
{
    text: Constants.WALK,
    preposition: 'to',
    requiresTool: false
},

```

With that in place, change this code in your **start.ts**:

```

{
  type: Constants.TOUCH,
  match: (game, target, tool): string => {
    if (game.currentLocation.destinations.length == 0) {
      game.currentLocation.destinations.push({
        name: 'Crawl through the undergrowth',
        target: Locations.Passage
      });
      return `You walk towards the fountain and touch the fountain water.
      It is a little cold. When you pull back your hand, you hear a soft
      muttering. It is coming from a small passage in the undergrowth.`;
    }
    else {
      return 'The fountain water is pleasant to the touch.';
    }
  }
},

```

Into this:

```

{
  type: Constants.TOUCH,
  match: (game, target, tool): string => {
    if (!game.currentLocation.features.get('passage')) {
      game.currentLocation.features.push(Features.Passage);
      return `You walk towards the fountain and touch the fountain water.
      It is a little cold. When you pull back your hand, you hear a soft
      muttering. It is coming from a small passage in the undergrowth.`;
    }
    else {
      return 'The fountain water is pleasant to the touch.';
    }
  }
},

```

Refresh your browser and restart. At first, the passage isn't there. Only after you touched the fountain is it added and can you use the Walk combination to travel through the passage to the next location.

Let's make the Passage location visual as well. Change the **passage.html** to this:

```

src ▸ Games ▸ MyAdventureGameVisual ▸ locations ▸ Passage.html ▸ visual-features
1  <visual-features img="fallenhero.jpg">
2    <area name="woundedwarrior" coords="350,96,378,137,416,182,438,253,519,191,469,137" shape="poly">
3    <area name="herbs" coords="265,440,385,479" shape="rect">
4    <area name="passageback" coords="2,292,93,478" shape="rect">
5  </visual-features>

```

Modify the Look combination in the **passage.ts** location like this:

```

{
  type: Constants.LOOKAT,
  match: (game, target, tool): string => {
    var feature = game.currentLocation.features.get('woundedwarrior');

    if (feature) {
      game.character.items.push(Items.Flask);
      game.currentLocation.features.remove(feature);
      return `Looking at the warrior, you see a flask on his belt.
              carefully, you remove it.`;
    }

    return null;
  }
}

```

Also add the herbs as a feature, like this:

```

    },
    Items.Herbs(),
  ],
},
return null;
}
}

```

Remove the item collection from the **passage.ts** as the herbs are now a feature.

Extend the **herbs.ts** like this:

```

return Item({
  name: 'Herbs',
  equipmentType: StoryScript.EquipmentType.Miscellaneous,
  picture: 'herbs.png',
  combinations: [
    combine: [
      {
        combinationType: Constants.TOUCH,
        match: (game, target: IItem, tool): string => {
          if (target) {
            game.character.items.push(target);
            game.currentLocation.features.remove(target);
            return `You collect the herbs.`;
          }

          return null;
        }
      }
    ]
  ]
});

```

We now show a warrior on the ground with the herbs close to him. You can pick up the herbs, they

will disappear once collected:

You are at A passage in the undergrowth



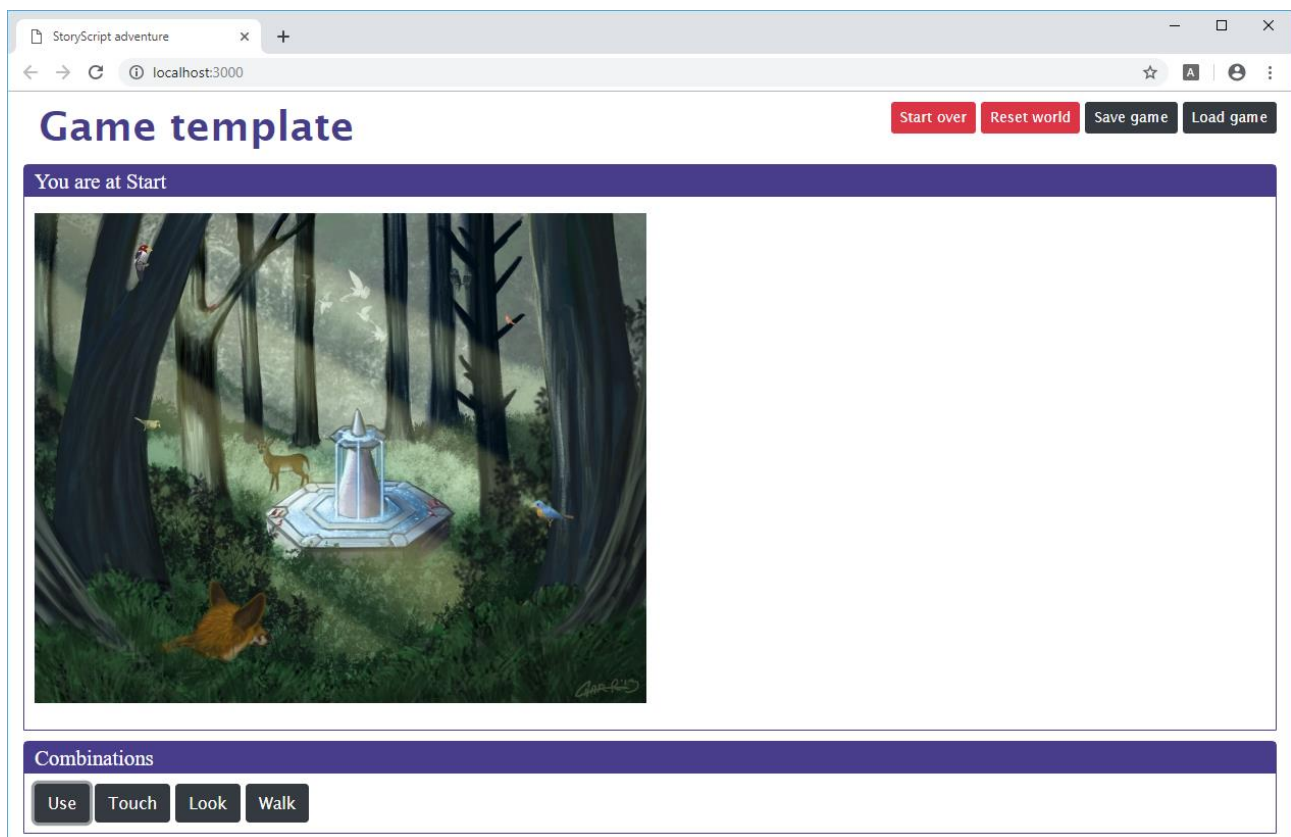
With that, we made most of the interactions visual. Let's also add the possibility to travel back to the fountain to the passage location by modifying the **passage.ts** and adding yet another feature like this:

```
Items.Herbs(),
{
  name: 'Passage back',
  combinations: {
    combine: [
      {
        combinationType: Constants.WALK,
        match: (game, target, tool): string => {
          game.changeLocation(Locations.Start);
          return 'You crawl back through the passage...';
        }
      ]
    ]
  }
}
```

As we're now no longer using the On the ground, Destinations and Messages screen elements, we can hide these to clean up our interface a bit. Add this to the **game.css** file:

```
# game.css  x
1  .back-label {
2      display: none;
3  }
4
5  #exploration-onground, #exploration-destinations, #action-log {
6      display: none;
7  }
```

Now your game looks like this:



Part 4. Role playing games

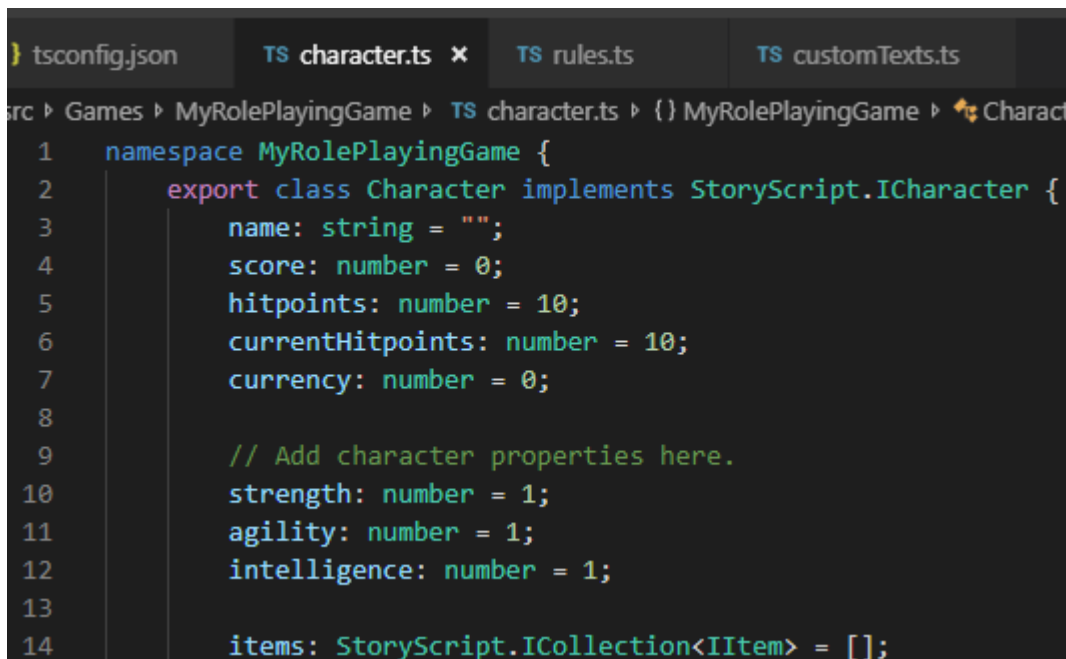
Now that you have a basic grasp of the first two types of games you can create with StoryScript, it is time to dive deeper and develop a basic understanding of the full power it has to offer. In terms of story and interaction, there is nothing more extensive to build than a Role Playing Game (RPG), in which the player interacts with the story world and its inhabitants and developing new skills and growing more powerful through these experiences.

Central to the RPG is the player character. There are plenty of RPGs in which you can assemble a party of characters, but in StoryScript (at least for now) there is one hero for the player to guide during his or her quest. So, we'll start by creating that hero.

Before you move on, create a new game like before so you can make a fresh start. Call it **'MyRolePlayingGame'** (also change the game name in the **customTexts.ts** file).

.10 Define your hero

You want to let the player create a hero with whom to play the game. To determine what such a hero looks like, open the **character.ts** file in your game's folder. You can add properties where it says so. Say we want to measure our hero's **strength**, **agility** and **intelligence**, which start at 1 and max out at 10 (we do not do anything to enforce that yet). We then add:



```
tsconfig.json TS character.ts x TS rules.ts TS customTexts.ts
src ▶ Games ▶ MyRolePlayingGame ▶ TS character.ts ▶ {} MyRolePlayingGame ▶ Character
1 namespace MyRolePlayingGame {
2     export class Character implements StoryScript.ICharacter {
3         name: string = "";
4         score: number = 0;
5         hitpoints: number = 10;
6         currentHitpoints: number = 10;
7         currency: number = 0;
8
9         // Add character properties here.
10        strength: number = 1;
11        agility: number = 1;
12        intelligence: number = 1;
13
14        items: StoryScript.ICollection<IItem> = [];
```

Next, we need to choose the equipment slots that we will use. You can enable these slots (the list can be reviewed in the StoryScript folder, character.ts file):

head, body, hands, leftHand, leftRing, rightHand, rightRing, legs, feet.

Let's use **head**, **body**, **left** and **right hands** and **feet** only. We define this by populating the character's equipment object like this:


```

items: StoryScript.ICollection<IItem> = [];

equipment: {
  head: IItem,
  body: IItem,
  leftHand: IItem,
  rightHand: IItem,
  feet: IItem,
};

constructor() {
  this.equipment = {
    head: null,
    body: null,
    leftHand: null,
    rightHand: null,
    feet: null
  }
}

```

Now, we want the player to make some choices when creating the hero that will determine his or her starting stats. For this we need to define the character creation process. Open the **rules.ts** file in your game's folder and find the line that says “Add the character creation steps here”. We will ask the player what name he wants to give to his character and ask two questions, showing the second question only after he answered the first. To do that, we'll create three steps (if we wanted to show both questions at the same time, we would define only two steps, one for the name and one containing both questions). Find the `getCreateCharacterSheet` method and change it to this, then add the three steps listed below inside the steps square brackets:

```

getCreateCharacterSheet = (): StoryScript.ICreateCharacter => {
  return {
    steps: [
    ]
  };
}

```

```

{
  attributes: [
    {
      question: 'What is your name?',
      entries: [
        {
          attribute: 'name'
        }
      ]
    }
  ]
},

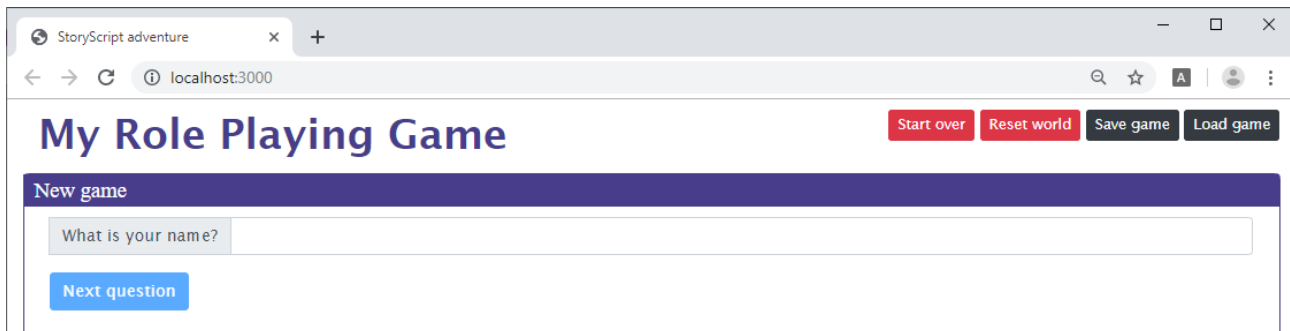
```



```
{
  questions: [
    {
      question: 'As a child, you were always...',
      entries: [
        {
          text: 'strong in fights',
          value: 'strength',
          bonus: 1
        },
        {
          text: 'a fast runner',
          value: 'agility',
          bonus: 1
        },
        {
          text: 'a curious reader',
          value: 'intelligence',
          bonus: 1
        }
      ]
    }
  ]
},
```

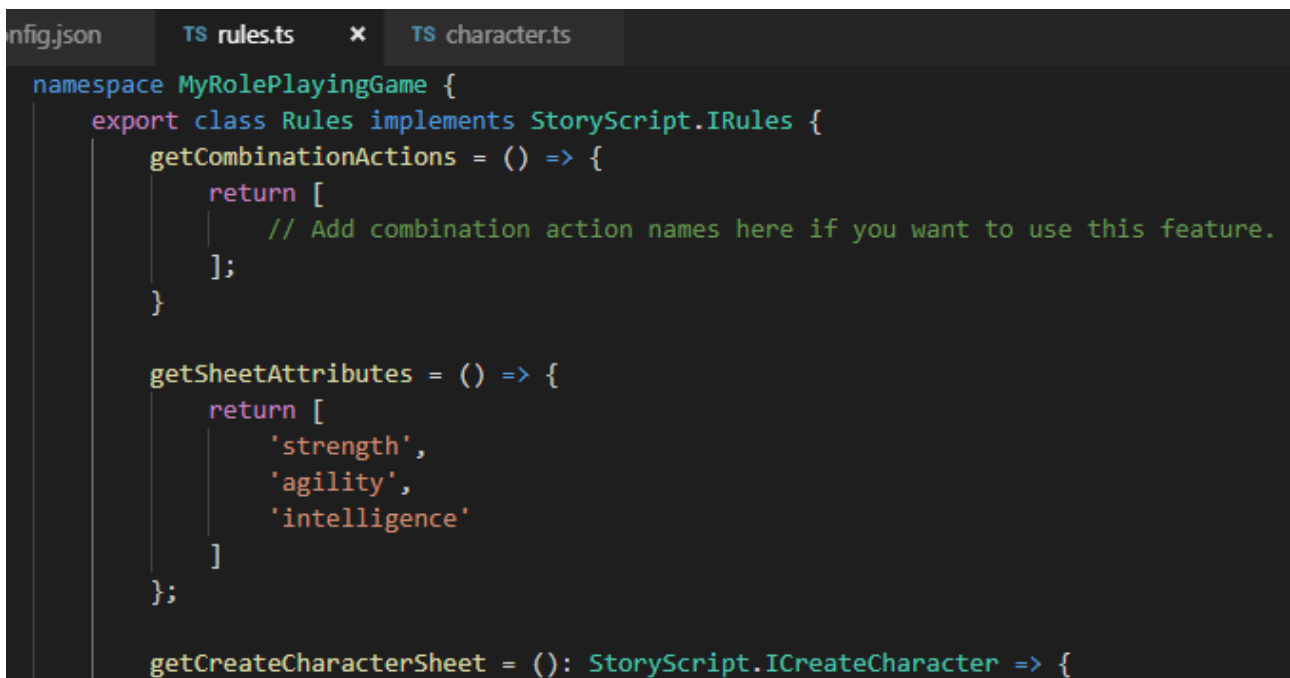
```
{
  questions: [
    {
      question: 'When time came to become an apprentice, you chose to...',
      entries: [
        {
          text: 'become a guard',
          value: 'strength',
          bonus: 1
        },
        {
          text: 'learn about locks',
          value: 'agility',
          bonus: 1
        },
        {
          text: 'go to magic school',
          value: 'intelligence',
          bonus: 1
        }
      ]
    }
  ]
}
```

Go back to your browser, which should have refreshed now. After entering a name, you should see the first question with the three options you defined:



The screenshot shows a web browser window with the title 'StoryScript adventure'. The address bar shows 'localhost:3000'. The main heading is 'My Role Playing Game'. In the top right corner, there are four buttons: 'Start over' (red), 'Reset world' (red), 'Save game' (dark grey), and 'Load game' (dark grey). Below the heading is a 'New game' section with a purple header. Inside this section, there is a text input field with the placeholder text 'What is your name?'. Below the input field is a blue button labeled 'Next question'.

When you're done creating your character, you'll want to display some vital statistics in the character sheet on the left-hand side of the screen. You can specify which character attributes to list in the rules. Let's add the three attributes we defined. Health and money will be displayed by default:



```
config.json  TS rules.ts  x  TS character.ts

namespace MyRolePlayingGame {
  export class Rules implements StoryScript.IRules {
    getCombinationActions = () => {
      return [
        // Add combination action names here if you want to use this feature.
      ];
    }

    getSheetAttributes = () => {
      return [
        'strength',
        'agility',
        'intelligence'
      ];
    };

    getCreateCharacterSheet = (): StoryScript.ICreateCharacter => {
```

When you finished character creation, you should now see something like this:

My Role Playing Game

Start over Reset world Save game Load game

Rutger		
Strength 2		
Agility 2		
Intelligence 1		
Health 10 / 10		
Money 0		

Equipment		
Head		
Right hand	Body	Left hand
Feet		

You are at Start
Your adventure starts here!

On the ground

Destinations

Messages

.11 Locations

There's much more you can do with locations than we've seen so far building the other games.

Multiple descriptions for varying circumstances

A nice feature is that you can have multiple descriptions in a location's .html file that you can choose from while running the game. As an example, let's make it so that the location description changes depending on the time of day, with a text for daytime and a text for night time. To do this, you need to repeat the <description> tag and add an attribute to the second tag that you will use to select it, for example 'night'. Our **Start.html** will then look like this:

```
<> Start.html x
1  <description name="day">
2      <p>
3          You are at home. You can hear the birds singing in the garden.
4      </p>
5  </description>
6  <description name="night">
7      <p>
8          You are at home. the frogs are croaking in the pond.
9      </p>
10 </description>
```

To actually show the night time description between 6 p.m. And 6 a.m., we need to create a selector in our location's .ts file. Modify your **start.ts** like this:

```

1 namespace MyRolePlayingGame.Locations {
2     export function Start() {
3         return Location({
4             name: 'Home',
5             descriptionSelector: (game: IGame) => {
6                 var date = new Date();
7                 var hour = date.getHours();
8
9                 if (hour <= 6 || hour >= 18) {
10                     return 'night';
11                 }
12
13                 return 'day';
14             },
15         });
16     }
17 }

```

Now, depending on your local time, you see either:

You are at Home

You are at home. You can hear the birds singing in the garden.

Or:

You are at Home

You are at home. the frogs are croaking in the pond.

Adding new locations

Now that we are happy with our start location, let's allow the player to go somewhere. We'll add two new locations, the hero's garden behind his home and the dirt road in front of it. You can do this by copying the Start location files, renaming them and changing the code inside, or create new files and add the minimum code needed (see below). NOTE: when copying, the file watcher can crash. If that happens the console will show a message like "The terminal process terminated with exit code: 1". If that happens, simply complete your changes and restart using **CTRL-SHIFT-B**. The result should look like this:

```

└─ locations
  ├── DirtRoad.html
  ├── TS DirtRoad.ts
  ├── Garden.html
  ├── TS Garden.ts
  ├── Start.html
  └── TS start.ts

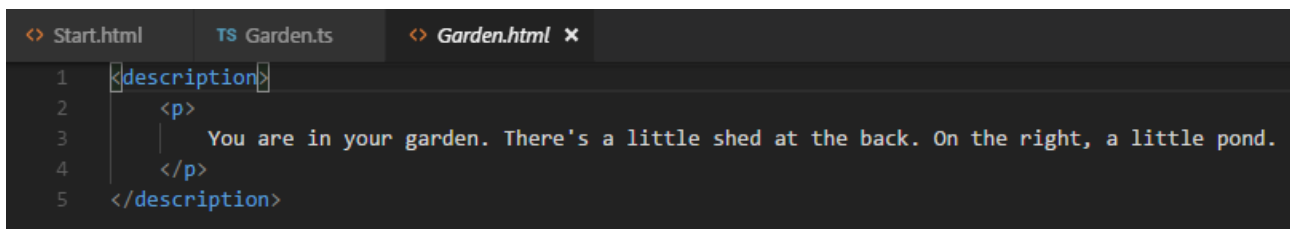
```

Note that you can should change the function names to match the file names for clarity (not required, you can select another name as long as it does not have spaces or special characters). E.g., your **Garden.ts** should look like this:



```
{ } tsconfig.json TS rules.ts TS Garden.ts x
1 namespace MyRolePlayingGame.Locations {
2     export function Garden() {
3         return Location({
4             name: 'Garden'
5         });
6     }
7 }
```

Next, change your .html files to add some proper descriptions. We use just one description for now. My **Garden.html** looks like this:



```
<> Start.html TS Garden.ts <> Garden.html x
1 <description>
2     <p>
3         You are in your garden. There's a little shed at the back. On the right, a little pond.
4     </p>
5 </description>
```

Linking locations

Allright, now we have three locations but no way to reach the new locations yet. To connect locations, open a location's .ts file and add a destinations property. We'll do so in the **Start.ts** file. The player should be able to go to the garden or the dirt road from the start location.

Start by adding a destinations array and a first destination object. A destination has a text (this is shown in the interface under the destinations header) and a target, the actual destination. Note that when you create the target and you typed Locations and entered the dot, visual studio will show you all your locations so you can easily pick the one you want:

```

1 namespace MyRolePlayingGame.Locations {
2   export function Start() {
3     return Location({
4       name: 'Home',
5       descriptionSelector: (game: IGame) => {
6         var date = new Date();
7         var hour = date.getHours();
8
9         if (hour <= 6 || hour >= 18) {
10          return 'night';
11        }
12
13        return 'day';
14      },
15      destinations: [
16        {
17          name: 'To the garden',
18          target: Locations.
19        },
20      ],
21    });
22  }
23 }

```

DirtRoad function MyRolePlayingGame.Locations.D...
Garden
Start

When you added both destinations, your destinations code looks something like this (note that you do NOT use brackets after the location name, you're not instantiating a new location, just referring to one):

```

destinations: [
  {
    name: 'To the garden',
    target: Locations.Garden
  },
  {
    name: 'Out the front door',
    target: Locations.DirtRoad
  }
],

```

When your browser reloaded, click '**Reset world**'. Then you should see this:

You are at Home

You are at home. You can hear the birds singing in the garden.

On the ground

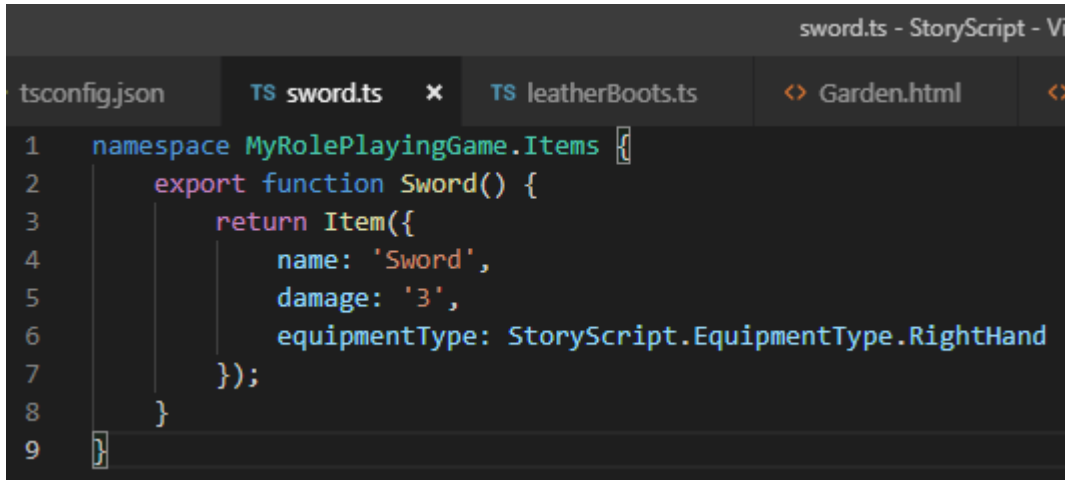
Destinations

To the garden Out the front door

Clicking one of the buttons should take you to that location. Note that now you are stuck because you have not defined the navigation the other way around. Do that, click 'Start over' and walk around your three-stage world.

.12 Items

Going out there without decent gear will cut any adventuring career short. Let's add some basic items for our hero to pick up at his home. Add two new files to the **items** folder in your game folder. Add **sword.ts** and **leatherBoots.ts**. They should look like this:

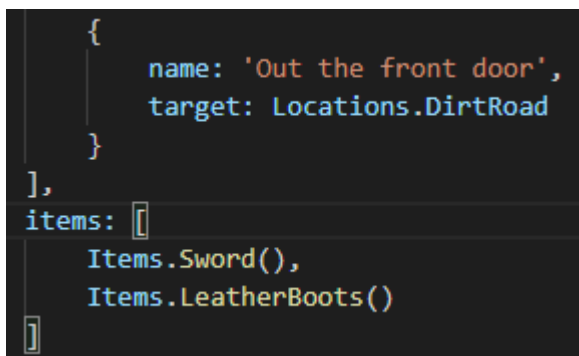
A screenshot of a VS Code editor window with the title bar 'sword.ts - StoryScript - Vi'. The editor shows the 'sword.ts' file with the following code:

```
1 namespace MyRolePlayingGame.Items {  
2   export function Sword() {  
3     return Item({  
4       name: 'Sword',  
5       damage: '3',  
6       equipmentType: StoryScript.EquipmentType.RightHand  
7     });  
8   }  
9 }
```

A screenshot of a VS Code editor window with the title bar 'leatherBoots.ts - StoryScript - Vi'. The editor shows the 'leatherBoots.ts' file with the following code:

```
1 namespace MyRolePlayingGame.Items {  
2   export function LeatherBoots() {  
3     return Item({  
4       name: 'Leather boots',  
5       defense: 1,  
6       equipmentType: StoryScript.EquipmentType.Feet  
7     });  
8   }  
9 }
```

Ok, now that we have the items, we need to make them available. Add them both to the starting location by modifying your **Start.ts**, like so:

A screenshot of a VS Code editor window showing a portion of the 'Start.ts' file. The code is as follows:

```
{  
  name: 'Out the front door',  
  target: Locations.DirtRoad  
},  
items: [  
  Items.Sword(),  
  Items.LeatherBoots()  
]
```

Click 'Reset world'. When you go to your home, you should see:

You are at Home

You are at home. You can hear the birds singing in the garden.

On the ground

Leather boots
Sword

Destinations

To the garden

Out the front door

You can pick up these items by clicking them, and you can then equip them or drop them again.

.13 Events

Let's now enhance our walking around experience a bit by adding an event to our garden. Events are anything you can think of that happen once, when the player first enters a new location or leaves first leaves one. We'll do something very simple and just write a message to the log. Modify your **Garden.ts** like this:

```
return {  
  name: 'Garden',  
  destinations: [  
    {  
      name: 'Enter your home',  
      target: Locations.Start,  
    }  
  ],  
  enterEvents: [  
    (game) => {  
      game.logToActionLog('You see a squirrel running off.');    }  
  ],  
}
```

Reset the game and go to the garden. The first time you go there (and first time only), you should see the message appearing under 'Messages':

Feet

Messages

You see a squirrel running off.

This is of course rather trivial, but events can be used for powerful stuff as you have the full game

API at your disposal in the event function. Check out the API documentation once you feel comfortable enough with the StoryScript concepts described in this tutorial.

.14 Enemies

Let's give the hero an opportunity to be heroic by adding a bandit to the dirt road which he can fight. First, add a new **bandit.ts** file to the enemies folder in your game folder. It should look like this:

```
1 namespace MyRolePlayingGame.Enemies {
2   export function Bandit() {
3     return Enemy({
4       name: 'Bandit',
5       hitpoints: 10,
6       attack: '1d6',
7       items: [
8         Items.Sword(),
9       ]
10    });
11  }
12 }
```

Note two things. First, I gave the bandit a sword, just like the one our hero can pick up at home. When an enemy is defeated, the items he carries are dropped on the floor in that location. Second, the **'attack'** property is not a property available by default in StoryScript. All entities, like locations and enemies, have some default properties you can use, but you can also easily add your own to suit your game.

Let's add a new property **'attack'** that is required on all the enemies in the game. Open the **enemy.ts** file in the interfaces folder and change it like this:

```
1 namespace MyRolePlayingGame {
2   export function Enemy(entity: IEnemy): IEnemy {
3     return StoryScript.Enemy(entity);
4   }
5
6   export interface IEnemy extends StoryScript.IEnemy {
7     // Add game-specific enemy properties here
8     attack: string;
9   }
10 }
```

Now, we need to add the bandit to the dirt road location. Modify **DirtRoad.ts** like this:

```

name: 'Dirt road',
destinations: [
  {
    name: 'Enter your home',
    target: Locations.Start
  }
],
enemies: [
  Enemies.Bandit()
]

```

Reset the game. You should see the bandit as you enter the dirt road:

You are at Dirt road

The little dirt road in front of your house leads to the main road to town. In the other direction, it ends in the woods.

Encounters

You face these foes:

Bandit

Start combat

.15 Creating a combat system

When you enter combat and click the Attack Bandit button, nothing happens. That's because there is no default combat system in StoryScript, as combat rules as well as how heroes, enemies and items are defined can vary wildly. You will have to program such a system yourself, which requires some skill with JavaScript and TypeScript.

For now, let's just add a very simple system to experiment with. Open your **rules.ts** and find the fight method, shown below:

```

fight = (game: IGame, enemy: IEnemy, retaliate?: boolean) => {
  var self = this;
  retaliate = retaliate == undefined ? true : retaliate;

  // Implement character attack here.

  if (retaliate) {
    game.currentLocation.activeEnemies.filter((enemy: IEnemy)
      // Implement monster attack here
    ));
  }
}

```

Modify it like this:

```

fight = (game: IGame, enemy: IEnemy) => {
  var damage = game.helpers.rollDice('1d6') + game.character.strength + game.helpers.calculateBonus(game.character, 'damage');
  game.logToCombatLog('You do ' + damage + ' damage to the ' + enemy.name + '!');
  enemy.hitpoints -= damage;

  if (enemy.hitpoints <= 0) {
    game.logToCombatLog('You defeat the ' + enemy.name + '!');
  }

  game.currentLocation.activeEnemies.filter((enemy: IEnemy) => { return enemy.hitpoints > 0; }).forEach(function (enemy) {
    var damage = game.helpers.rollDice(enemy.attack) + game.helpers.calculateBonus(enemy, 'damage');
    game.logToCombatLog('The ' + enemy.name + ' does ' + damage + ' damage!');
    game.character.currentHitpoints -= damage;
  });
});

```

This combat system is very simple. It just rolls a six-sided die for the hero and adds his strength and weapons damage bonus to the result. It writes a message to show the damage done, and subtracts the result from the enemy's hitpoints. When the enemy has 0 or less hitpoints, another message is written and the method exits, returning true for winning combat. If not, the enemy attacks the player in the same way.

Reset and click Attack bandit. After a few clicks the bandit might be defeated and you see something like this:



When you click 'Close', notice that the Bandit's sword is now lying on the ground:

You are at Dirt road

The little dirt road in front of your house leads to the main road to town. In the other direction, it ends in the woods.

On the ground

Sword

Destinations

Enter your home

You might also lose, in which case you'll see something like this:

You lost...

You have failed your quest!

Your score: 0

Try again

.16 Actions and CombatActions

For the game locations to become interesting, they should offer more than only enemies and events. There should be things to do, buttons to push. That's where actions come in. When you define actions, these will be available at the location after all enemies have been defeated. Examples of actions you might want to add are search, to find more items when the character is alert enough, opening chests, etc.

Let's add two actions to the garden, one to search the shed and one to look in the pond. Add this code to **Garden.ts**:

```
15 ],
16   actions: [
17     {
18       text: 'Search the Shed',
19       execute: (game) => {
20         // Add a new destination.
21         game.currentLocation.destinations.push({
22           name: 'Enter the basement',
23           target: Locations.Basement
24         });
25       },
26     },
27     {
28       text: 'Look in the pond',
29       execute: (game: IGame) => {
30         game.logToLocationLog('The pond is shallow. There are frogs and snails in there, but nothing of interest.');
```

Note that I had to add the Basement location to be able to add the new destination. If you are following along, add that location too.

Reset and you should see the following in the garden:

You are at Garden

You are in your garden. There's a little shed at the back. On the right, a little pond.

On the ground

Actions

Search the Shed

Look in the pond

Destinations

Enter your home

When you press the Search button, a new destination will be added and the Search button removed. Look in the pond will remove the action and write to the location description. If you want to keep the button when it is clicked, have the action's execute method return *true* (check out the API).

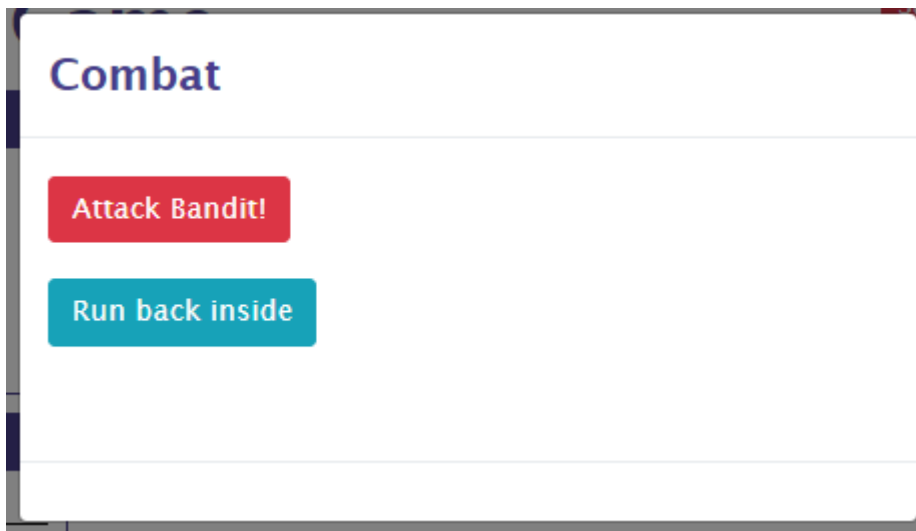
Combat actions are like actions but are available during combat only, when regular actions are not available. Let's allow the hero to run back home when he is afraid to stand up to the bandit. Add this code to **DirtRoad.ts**:

```

11     enemies: [
12         Enemies.Bandit
13     ],
14     combatActions: [
15         {
16             text: 'Run back inside',
17             execute: (game: IGame) => {
18                 game.changeLocation('Start');
19                 game.logToActionLog(`You storm back into your house and slam the
20                 door behind you. You where lucky... this time!`);
21                 return true;
22             }
23         }
24     ]
25 }

```

When you go out the door to face the bandit, you should see the option to run back inside. When you take it, you will be told you ran away:



Messages

You storm back into your house and slam the door behind you. You where lucky... this time!
You see a squirrel running off.

.17 Doors, gates, rivers and other barriers

To make the world more interesting and locations less easy to reach, you can add barriers that impede the hero's progress. Barriers can be anything from doors, locked gates, rivers, chasms or even leaving the atmosphere of a planet.

Barriers are added to destinations, so that it is not simply a matter of moving from one location to the next by pressing a button anymore. As an example, let's add a trap door as a barrier between the garden and the shed basement. Let's leave it unlocked for now, we'll add a required key later.

Open the **Garden.ts** file and add the following barrier code to the Basement destination:

```
name: 'Enter the basement',
target: Locations.Basement,
barrier: {
  name: 'Wooden trap door',
  actions: [
    {
      name: 'Inspect',
      action: (game: IGame) => {
        game.logToLocationLog('The trap door looks old but still strong due to steel reinforcements. It is locked.');
```

When you run your game and search the shed, the Basement destination should be greyed out because it is blocked by the trap door:

Actions

Look in the pond

Destinations

Wooden trap door

Inspect

Enter your home

Enter the basement

Clicking on the trap door will trigger the action selected in the dropdown. When you leave it at 'Inspect', a message will be written to the location description and the Inspect action will be removed. When the Open action is chosen, the barrier will be removed, including any actions remaining.

Notice that one of the barrier actions uses a StoryScript action, the Open action. You can either define your own method to handle a barrier action or use a default one. This is a far more general concept that will be explained in a bit more detail in the chapter on the API. For now, notice that you use a StoryScript action and pass it a method that is to be executed (in this case) AFTER performing the default action of opening the door (removing the barrier).

After opening the trap door, the barrier is gone and you can access the basement destination:

Destinations

Enter your home

Enter the basement

Right. Barriers really make the world more interesting and interactive, but we can add some more excitement by requiring the player to acquire the means to pass the barrier before letting him through. In the case of the trap door, this is a key, but you could also require a boat to pass a river or a rocket to travel to another planet, to name just a few possibilities. Let's see how to add that trap door key.

First, add a new item and call it Basement Key (file `basementKey.ts`):

```

1 namespace MyRolePlayingGame.Items {
2   export function BasementKey() {
3     return Key({
4       name: 'Basement key',
5       open: {
6         name: 'Open',
7         action: StoryScript.Actions.OpenWithKey((game: IGame, destination: StoryScript.IDestination) => {
8           game.logToLocationLog('You open the trap door. A wooden staircase leads down into the darkness.');
```

Notice that we again use a standard StoryScript action, `OpenWithKey`. We pass it the same callback we used for the open action on the barrier.

Now, remove the Open action on the trap door. Instead, define the key required. Replace the barrier code with:

```
name: 'Enter the basement',
target: Locations.Basement,
barrier: {
  name: 'Wooden trap door',
  key: Items.BasementKey,
  actions: [
    {
      name: 'Inspect',
      action: (game: IGame) => {
        game.logToLocationLog('The trap door looks old but still strong due to steel reinforcements. It is locked.');      }
    }
  ]
}
```

A note on actions added during runtime

In the example above, I added an inspect action at run-time. Because of the way StoryScript handles saving the game state, please be aware that actions added during run-time will be treated slightly different from actions that are present at design-time. Make sure that any actions you add once the game is running are self-contained, meaning they should only reference arguments passed into them or use variables defined in them, and not anything else!

When you run the game, only the inspect action is available on the trap door until you have the basement key in your possession. Let's bring a few things together and give the key to the bandit we added to the dirt road location, so the player will have to defeat him in order to enter the basement:



```
tsconfig.json TS basementKey.ts TS bandit.ts x
src ▸ Games ▸ MyRolePlayingGame ▸ enemies ▸ TS bandit.ts ▸ {}
1 namespace MyRolePlayingGame.Enemies {
2   export function Bandit() {
3     return Enemy({
4       name: 'Bandit',
5       hitpoints: 10,
6       attack: '1d6',
7       items: [
8         Items.Sword(),
9         Items.BasementKey()
10      ]
11    });
12  }
13 }
```

Play the game, defeat the bandit, pick up the key he drops and go to the garden. With the key in your hand, you should now be able to open the trap door again:

Rutger
Strength 3
Agility 1
Intelligence 1
Health 7 / 10
Money 0

Equipment
Head

Right hand	Body	Left hand
Sword		
Feet		
Leather boots		

Backpack
Sword Equip Drop
Basement key Drop

You are at Garden
You are in your garden. There's a little shed at the back. On the right, a little pond.

On the ground

Actions
Look in the pond

Destinations

Enter your home

Wooden trap door
Inspect
Inspect
Open

When you open the door, you get to keep the key. If you want to create a use-once key, modify the key like this:

```
TS createCharacter.ts TS Garden.ts TS basementKey.ts x TS DirtRoad.ts TS trade.ts
1 namespace MyNewGame.Items {
2   export function BasementKey(): StoryScript.IKey {
3     return {
4       name: 'Basement key',
5       keepAfterUse: false,
6       open: {
7         name: 'Open',
8         action: StoryScript.Actions.OpenWithKey((game: IGame, destination: StoryScript.IDestination) => {
9           game.logToLocationLog('You open the trap door. A wooden staircase leads down into the darkness.');
```

.18 Persons

Not everything moving you meet along the way needs to be hostile to your character. You can also add persons, people (or something else) that you can talk to and/or trade with. You might anger these persons, at which point they can become enemies if you allow this in your game.

We'll add a friend to the game, who is present in your living room. Create a new folder 'persons' under your game folder and add two files to it, **friend.html** and **friend.ts**. The html file is very important for persons, as you'll define the conversations you have with them here.

Add this code to the **friend.ts** file:

```

1  namespace MyNewGame.Persons {
2      export function Friend(): IPerson {
3          return {
4              name: 'Joe',
5              hitpoints: 10,
6              attack: '1d6',
7              currency: 10,
8              conversation: {
9              }
10         }
11     }
12 }

```

Although the conversation property is now an empty object, it is important that it is there nonetheless as the presence of this property will determine whether or not the engine will try to load the conversation file.

Now that we created the friend, add him to the living room by adding him in the **start.ts** file:

```

return Location({
    name: 'Home',
    descriptionSelector: (game: IGame) => {
    },
    destinations: [ ...
    persons: [
        Persons.Friend()
    ]
});

```

Build and run the game. In the living room, you should now see your friend:

Encounters

Joe

Talk to Joe

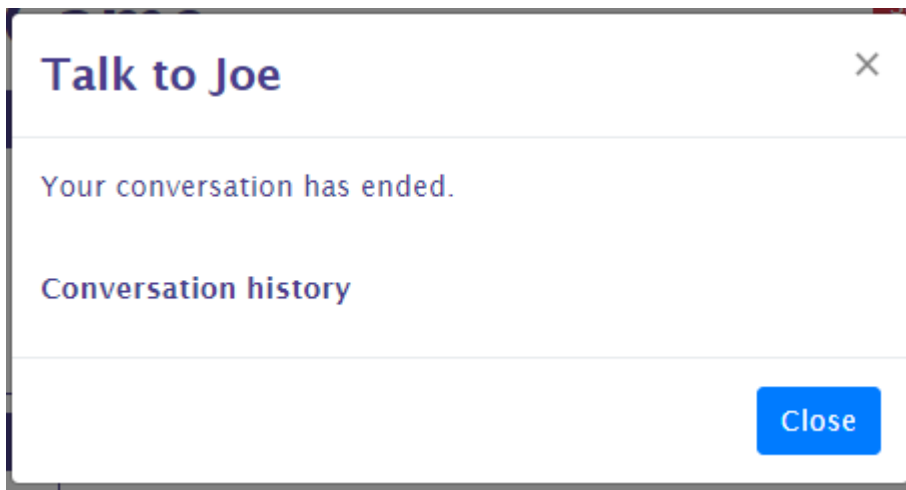
Attack Joe!

You are at Home

You are at home. You can hear the birds singing in the garden.

If you don't want to be able to attack Joe, set the `canAttack` property to `false`. The attack button will then disappear.

Try talk to Joe. As you haven't given him any lines yet, he has not much to say:



Making Joe a bit more of a conversationalist is the topic of the next chapter. You can interact with persons in more ways, by trading with them or doing assignments (quests) for them. These will be covered in later chapters as well.

.19 Conversations

So we want to be able to chat with Joe a bit. His lines and the replies the player character has available are specified in the friend.html file. Let's start with something simple and add this code to the file:

```
TS Garden.ts    TS basementKey.ts    TS Friend.ts    <> Friend.h
1  <conversation>
2    <node name="hello">
3      <p>
4        Hello there. How are you doing today?
5      </p>
6      <replies>
7        <reply node="fine">
8          Fine, thanks.
9        </reply>
10     </replies>
11   </node>
12   <node name="fine">
13     <p>
14       Good. What are you up to today?
15     </p>
16   </node>
17 </conversation>
```

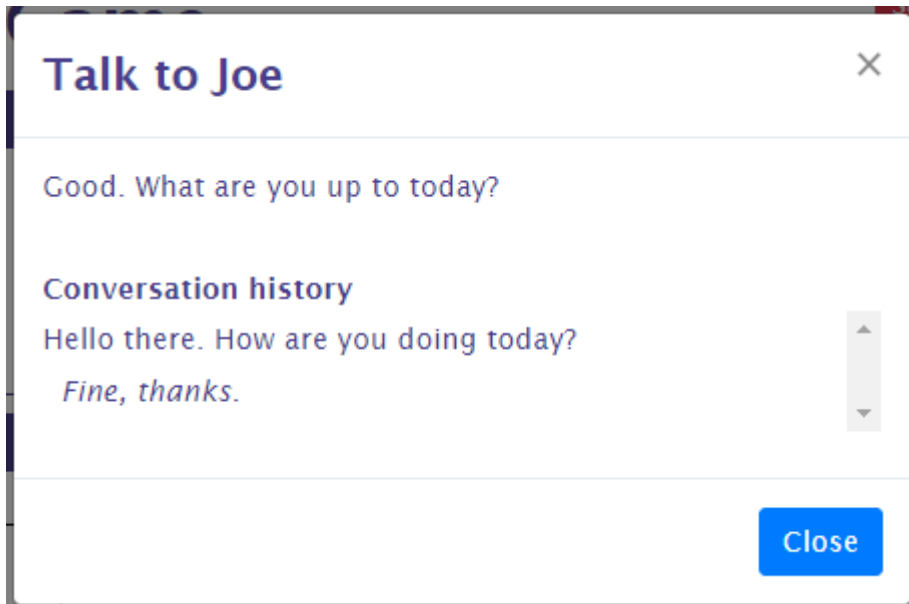
A conversation is made up of nodes. Within a node, you can use all the HTML you want to create a colourful discussion. This html are the lines of the person. You create replies that the player character can use as a response by adding the special **<replies>** tag and adding child **<reply>** elements for each available reply.

You can see that there are two nodes in this conversation, and they both have a name. This is very important, as that name is used to link the nodes to each other to create a conversation flow. As you first speak to a person, the engine has a number of ways to determine the node to start with. As we

have specified nothing special, the first node, named 'hello', will be used.

So, when you first talk to Joe, he'll ask how you are doing. You can see there is just one reply available right now, saying 'Fine, thanks'. Also, you can see that this reply has an attribute called 'node'. This is used to move to a new node when using that reply. You can see that the name of the node to go to is specified, 'fine'. So selecting this reply will make Joe go on with his lines in the 'fine' node.

Talk to Joe again, choosing the only reply options available right now. The conversation should go like this:



You see that the words exchanged are logged, so you can always review what's been said in case you forget.

You can add in a reply that is available to everything a person has to say by specifying a default response, which will allow you to end the conversation a bit less abruptly:

```
TS Friend.ts    <> Friend.html x    TS conversation.ts
1  <conversation>
2    <default-reply>
3      Never mind. See you later.
4    </default-reply>
5    <node name="hello">
```

Great, some interactivity! You can expand on this conversation by adding additional nodes and replies linking to these nodes to get a basic conversation going. That's nice, but it wouldn't it be great if the conversation is actually influenced by the things going on in the world around you?

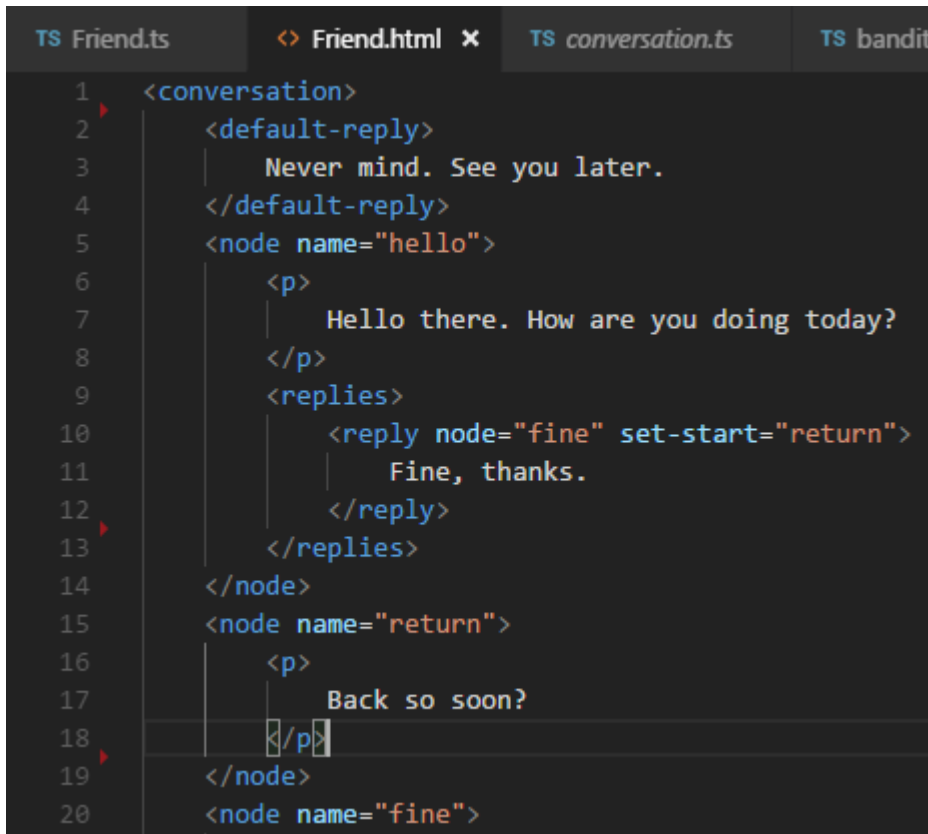
Well, of course we have some options to do this (otherwise it would not make for much of an interactive story). They are:

- Setting a new start node, so the conversation does not start all over again when you re-visit your friend.
- Making replies conditionally available. For example, you could require the character to be witty enough in order to make some remarks.
- Triggering an action when you reply in a certain way.

- Linking your replies to quests.

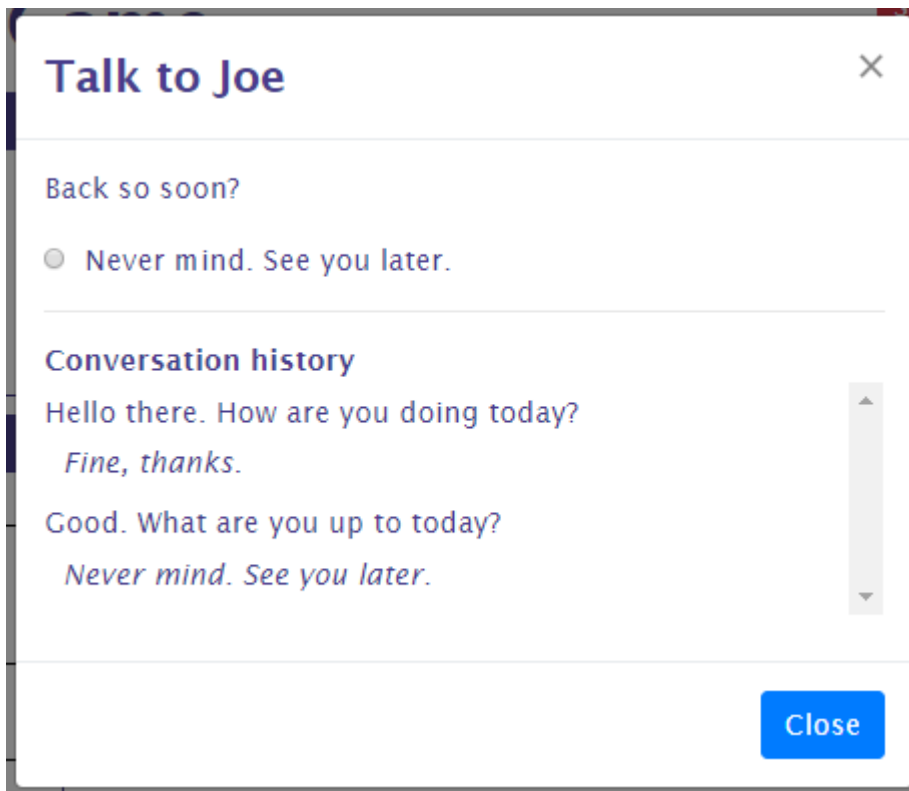
How quests work with conversations is covered in the chapter on quests. Here, we'll go on to look at the first three options.

Let's first change what Joe has to say when we talk to him again to make him a bit less of an automaton. We do this by adding the 'set-start' attribute to the first reply and adding a new node for his new lines like this:

A screenshot of a code editor with four tabs: 'TS Friend.ts', 'Friend.html x', 'TS conversation.ts', and 'TS bandit'. The 'TS conversation.ts' tab is active, showing XML code for a conversation. The code is as follows:

```
1 <conversation>
2   <default-reply>
3     |   Never mind. See you later.
4   </default-reply>
5   <node name="hello">
6     |   <p>
7       |   Hello there. How are you doing today?
8     </p>
9     <replies>
10    |   <reply node="fine" set-start="return">
11    |     |   Fine, thanks.
12    |   </reply>
13  </replies>
14 </node>
15 <node name="return">
16   |   <p>
17   |     |   Back so soon?
18   |   </p>
19 </node>
20 <node name="fine">
```

When you now return to Joe, he should have something new in store:



Conditionally available replies

Having replies available only when certain conditions are met is when conversations are getting more interesting and more attuned to what goes on in the game world. For this, you can set the 'requires' attribute on a reply node. You can require several things:

- That the player character meet an attribute threshold, e.g. he should be smart enough to talk about relativity. The syntax for this is: **requires="[attribute]=[value]"**, e.g. **requires="intelligence=3"**.
- That the player has a special item with him. Use **requires="item=[itemId]"**, e.g. **requires="item=sword"** for this.
- That the player visited a certain location: **requires="location=[locationId]"**, e.g. **requires="location=garden"**.
- That the player has started, meets the requirements to complete or completed a quest. See the chapter on quests for using these requirements.

We'll add an example of the first three requirements to our conversation:

```
TS Friend.ts    <> Friend.html x    TS bandit.ts    TS DirtRoad.ts    TS trac
5      </default-reply>
6      <node name="hello">
7      |   <p>...
9      |   </p>
10     |   <replies>
11     |   |   <reply node="fine" set-start="return">
12     |   |   |   Fine, thanks.
13     |   |   </reply>
14     |   |   <reply node="workout" requires="strength=3">
15     |   |   |   Great. I have just completed my workout.
16     |   |   </reply>
17     |   </replies>
18     </node>
19     <node name="return">
20     |   <p>...
22     |   </p>
23     |   <replies>
24     |   |   <reply node="garden" requires="location=garden">
25     |   |   |   I just walked through the garden.
26     |   |   </reply>
27     |   |   <reply node="key" requires="item=basementkey">
28     |   |   |   I found a key.
29     |   |   </reply>
30     |   </replies>
31     </node>
32     <node name="workout">
33     |   <p>
34     |   |   I can see that.
35     |   </p>
36     </node>
37     <node name="garden">
38     |   <p>
39     |   |   Did you see the hedgehog?
40     |   </p>
41     </node>
42     <node name="key">
43     |   <p>
44     |   |   Hm. I don't know what lock that's for.
45     |   </p>
46     </node>
```

For your character to meet the strength requirement, you should select the first answer to both questions when creating a character. Go to the garden to talk to Joe about its inhabitants.

Try these requirements. Replies that you do not yet qualify for should be hidden from you. If you want them to show but unselectable, set the flag on the conversation in the .ts file like this:

```

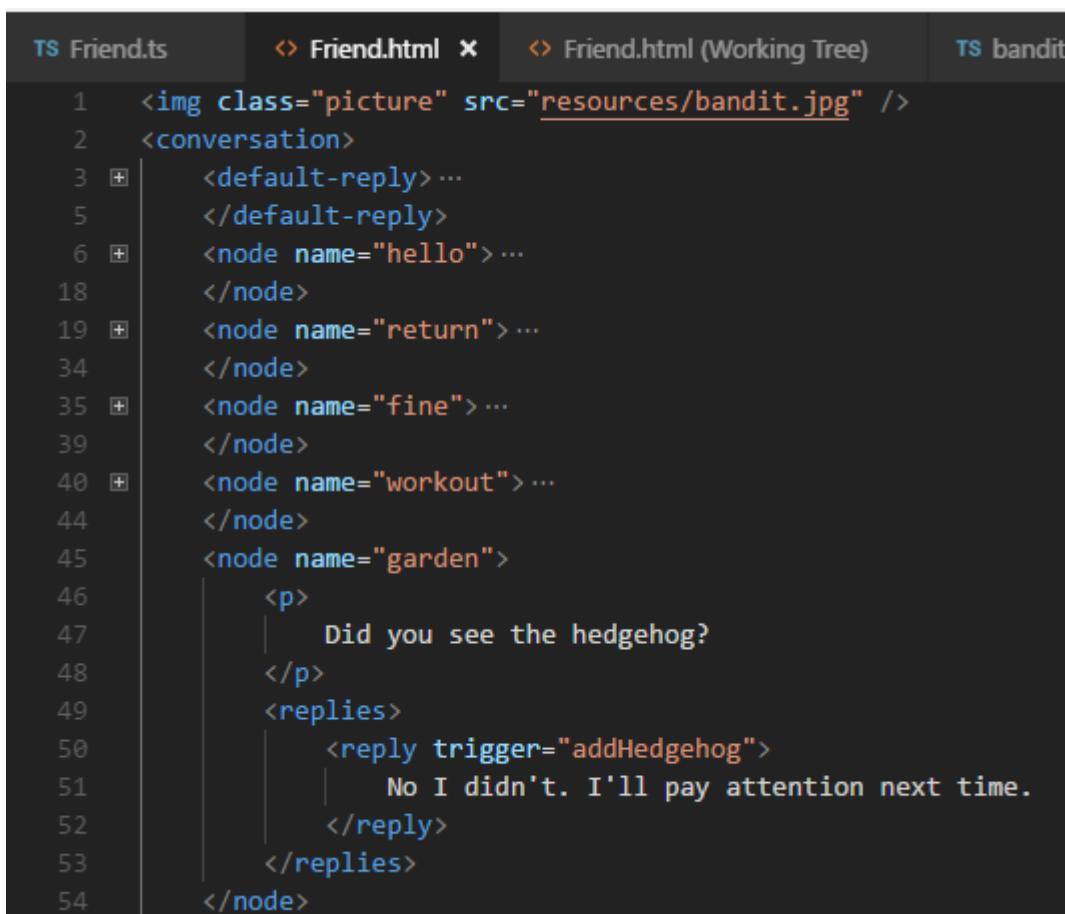
    },
    conversation: {
      showUnavailableReplies: true
    },
  },

```

Triggering actions on replies

The last option of conversations to talk about in this chapter is triggering actions on selecting a specific reply. For this to work, you need to use the 'trigger' attribute with the name of the action to trigger on the reply in the .html file. The actual action you specify in the action collection on the conversation element in the .ts file.

Let's create an example. There is a hedgehog in the garden, but unless Joe told you about it you will not see it. To make this work, we add the trigger first in the .html file:



```

1  
2  <conversation>
3    <default-reply> ...
5    </default-reply>
6    <node name="hello"> ...
18   </node>
19   <node name="return"> ...
34   </node>
35   <node name="fine"> ...
39   </node>
40   <node name="workout"> ...
44   </node>
45   <node name="garden">
46     <p>
47       Did you see the hedgehog?
48     </p>
49     <replies>
50       <reply trigger="addHedgehog">
51         No I didn't. I'll pay attention next time.
52       </reply>
53     </replies>
54   </node>

```

Second, we specify what the addHedgehog function does in the .ts file:


```

conversation: {
  actions: {
    'addHedgehog': (game, person) => {
      var garden = game.locations.get(Locations.Garden);
      garden.hasVisited = false;
      garden.enterEvents.length = 0;

      garden.enterEvents.push((game: IGame) => {
        game.logToLocationLog('Ah! There is the hedgehog Joe was talking about.');
```

Note that I use a few tricks here to make this work. Events are run the first time the player visits a location, so I reset the `hasVisited` flag on the Garden location first. Then I clear the events list, because the squirrel ran off the first time you visited the garden and it has not returned yet. Then, I add the new event to the Garden, writing a simple message to the location log.

Now, when you visit the garden, talk to Joe about it and return to the garden, you should see the hedgehog.

.20 Trade and storage

As you build a world to explore and interact with, adding item stores is something you'll want to do sooner or later. Add a locker here, a chest there, and a store in the centre of a small village. Both storage and trade in StoryScript are handled by trade, where storage is a special form of trading where prices are zero and items can thus be moved to and from storage without changing anything else.

Trade can be added in two forms: either on a person (see chapter 12 on persons) or on a location. The syntax is the same, and the way it works as well but for a few small differences.

As an example, we'll add a personal closet to the bedroom, which has some items you can pick up there. You can also put items back in. This will demonstrate the basics of trading.

Create a new location for the bedroom with a `.ts` and `.html` file. Open the **bedroom.ts** file and add the following code:

```

src ▸ Games ▸ MyRolePlayingGame ▸ locations ▸ TS bedroom.ts ▸ {} MyRolePla
1  namespace MyRolePlayingGame.Locations {
2      export function Bedroom() {
3          return Location({
4              name: 'Bedroom',
5              destinations: [
6                  {
7                      name: 'Back to the living room',
8                      target: Locations.Start
9                  }
10             ]
11         });
12     }
13 }
```

After destinations, add the code for trading:

```
    target: Locations.Start
  }
],
trade: [
  {
    title: 'Your personal closet',
    description: 'Do you want to take something out of your closet or put it back in?',
    buy: {
      description: 'Take out of closet',
      emptyText: 'The closet is empty',
      itemSelector: (game: IGame, item: IItem) => {
        return item.value != undefined;
      },
      maxItems: 5,
      priceModifier: 0
    },
    sell: {
      description: 'Put back in closet',
      emptyText: 'You have nothing to put in the your closet',
      itemSelector: (game: IGame, item: IItem) => {
        return item.value != undefined;
      },
      maxItems: 5,
      priceModifier: (game: IGame) => {
        return 0;
      }
    }
  }
]
```

Link the bedroom to your home by adding a destination to the **Start.ts** file.

Go to the bedroom. You should see a button with the title specified in the trade code, and when you press it you should see the trade screen:

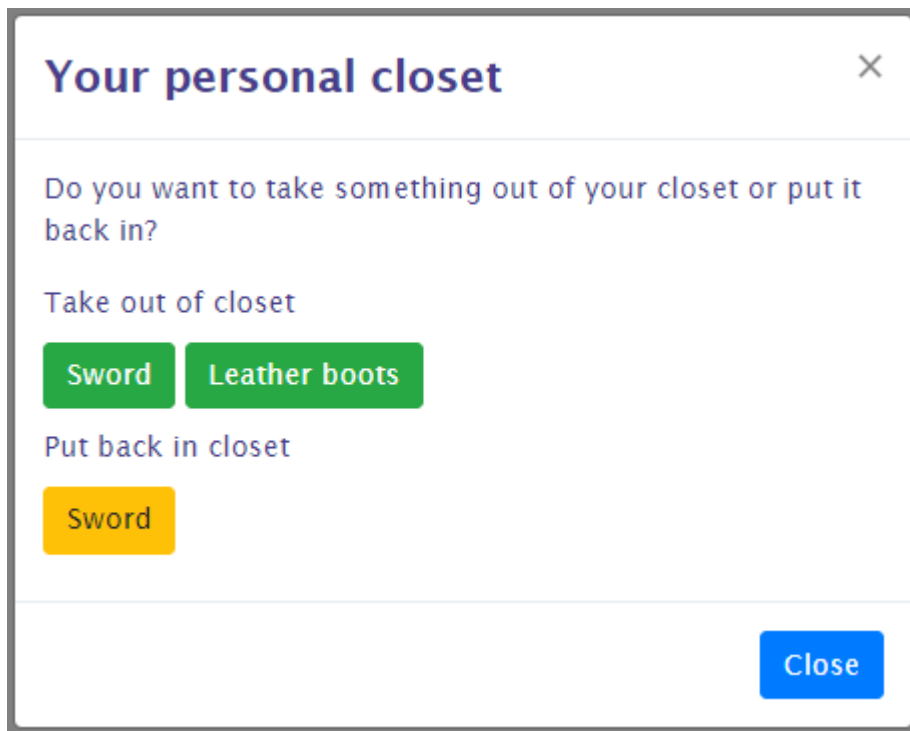
On the ground

Actions

Your personal closet

Destinations

Back to the living room



Ok, let's explore the options that are not obvious. First, you have both a buy and a sell side to the trade. This is defined from the perspective of the user, so the sell part is about the player 'selling' stuff to the trade object (in this case just putting his gear in the closet). Apart from the `maxItems` property, which determines the number of items available for buying or selling during one visit, both buy and sell have two important properties:

- `itemSelector`. This is a function that returns the items that can be bought from the trader or sold to him, her or it. In this example, the items available for taking from the closet are all items in the game that have a `value` property. That's why the sword and the leather boots show up and not the basement key. The buy item selector by default will select from all the items you defined for your game. The sell item selector selects items only from your character's inventory, and will not include equipped items.
- `PriceModifier`: this can either be a number or a function that returns a number that will be multiplied by the item's value. For example, if you want the player to pay twice the value of an item to a trader in order to buy it, the number should be 2. In this example, the number on both sides is 0 because we want to put things in and take them out of the closet without paying any money.

Apart from a storage object or a store, you can also put the trade code on a person in order to be able to trade with that person. Let's enable trading with Joe by adding some code to the `friend.js` file:

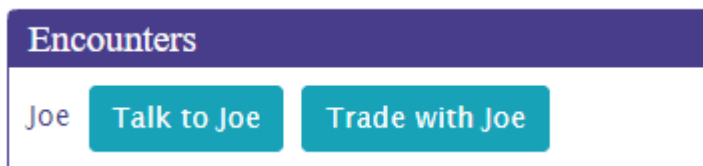
```

    currency: 10,
    trade: {
      ownItemsOnly: true,
      buy: {
        description: 'I\'m willing to part with these items...',
        emptyText: 'I have nothing left to sell to you...',
        itemSelector: (game: IGame, item: IItem) => {
          return item.value != undefined;
        },
        maxItems: 5
      },
      sell: {
        description: 'These items look good, I\'d like to buy them from you',
        emptyText: 'You have nothing left that I\'m interested in',
        itemSelector: (game: IGame, item: IItem) => {
          return item.value != undefined;
        },
        maxItems: 5
      }
    },
  },
  conversation: {

```

As you can see, I omitted the priceModifier here. That means Joe will buy and sell items for precisely their value.

Now you should be able to trade with Joe:



Some last things of note on trading are:

- **currency.** This will tell how much currency the trader has available for trading. **NOTE:** When trading with a person, the person's currency value is used. Traders can buy only as long as they have the money to pay for items that you have to offer. When you buy from them, the money you pay them will replenish their coffers.
- **InitCollection:** this is a function that is called before creating the list of items the trader has for sale. It returns true or false. If true is returned, the list of items for sale is refreshed. If not, the items that were on sale earlier will stay. If, for example, you want the trader's stock to be replenished based on some event, use this function to check whether the event has occurred and then return true for the list to be reinitialized.
- **ownItemsOnly:** this flag determines whether the itemSelector function will be applied to the items available in the game or the items in the trader's inventory. This way, you can allow the trader to sell only from his own gear and nothing else.

.21 Quests

In any kind of story, the main character has to run errands or do favours. In StoryScript, these can be created as quests.

Let's add a little something we can do for Joe. Joe has misplaced his personal journal and he would really like to have it back. You can help him find it. Create a new folder 'quests' in your game's folder and add a file called journal.ts to it. Add this code:



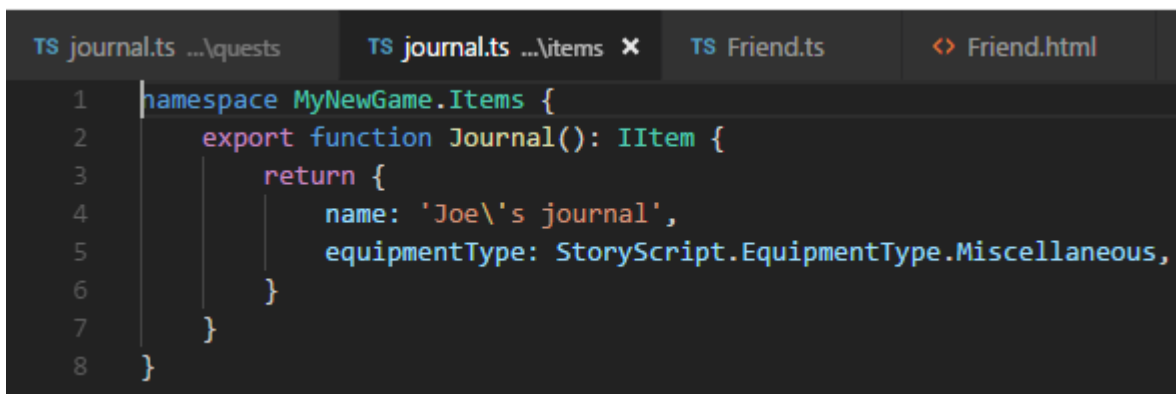
```
src ▸ Games ▸ MyRolePlayingGame ▸ quests ▸ TS journal.ts ▸ {} MyRolePlayingGame.Quests ▸ Journal
1  namespace MyRolePlayingGame.Quests {
2      export function Journal() {
3          return Quest({
4              name: "Find Joe's journal",
5              status: (game, quest, done) => {
6                  return 'You have ' + (done ? '' : 'not ') + 'found Joe\'s journal' + (done ? '!' : ' yet.');
```

You can see that there are a number of elements to this. Apart from the quest name, there is an action you can run as soon as the quest starts. It is not used in this example. Further, there is a status property, which can be either a static text or a function returning some text, which tells what the current status of the quest is. Here, it'll format a message telling you whether or not you found Joe's journal.

Next, there is a function called to check whether the quest requirements are met called checkDone. It should return either true or false, depending on whether the player meets the quest requirements or not.

Finally, the complete function will trigger when the quest is completed and the reward claimed. Joe will give the player some cash when the journal is returned to him (NOTE: removing items in this way, using the item function reference instead of an actual object, will remove the first item of the specified type only. E.g. if the player would have two journals, only one would be removed. In cases like these, first get a specific item and then pass the actual item object to the remove function).

For this quest, I added a really simple quest item:



```
TS journal.ts ...\quests  TS journal.ts ...\items x  TS Friend.ts  <> Friend.html
1  namespace MyNewGame.Items {
2      export function Journal(): IItem {
3          return {
4              name: 'Joe\'s journal',
5              equipmentType: StoryScript.EquipmentType.Miscellaneous,
6          }
7      }
8  }
```

We have the elements that we need, now we need to wire them together. The simplest way to do this is to extend the conversation you can have with Joe with a few nodes and replies. First add a new reply when you come to see Joe for a second time:

```

<conversation>
+  <default-reply> ...
    </default-reply>
+  <node name="hello"> ...
    </node>
    <node name="return">
      <p>
        Back so soon?
      </p>
      <replies>
+      <reply node="garden" requires="location=garden"> ...
        </reply>
+      <reply node="key" requires="item=basementkey"> ...
        </reply>
        <reply node="lostjournal">
          I noticed you seem a bit upset.
        </reply>
      </replies>
    </node>

```

Then add the new nodes that are needed for the quest to unfold:

```

+ <node name="key"> ...
  </node>
  <node name="lostjournal">
    <p>
      I guess I am. I can't seem to find my personal journal. It is very important to me. Can you help me find it?
    </p>
    <replies>
      <reply node="pleasefindit" quest-start="Journal" set-start="foundjournal">
        Of course. I'll return it as soon as I see it.
      </reply>
    </replies>
  </node>
  <node name="pleasefindit">
    <p>
      I hope you have better luck than I searching.
    </p>
  </node>
  <node name="foundjournal">
    <p>
      Have you found my journal?
    </p>
    <replies>
      <reply>
        Not yet, sorry.
      </reply>
      <reply requires="quest-done=Journal" quest-complete="Journal" set-start="return">
        Yes I have. Here it is!
      </reply>
    </replies>
  </node>
</conversation>

```

As you see, I used a few new reply attributes here, `quest-start` and `quest-complete`. These will trigger the start and complete functions of the quest whose name is specified, so the Journal quest in this case. Also, I added one of the quest-related `requires` attributes, in order not to show the reply that you found the journal until you actually have it in your possession. You can use the `quest-start` and `quest-complete` requirements to show replies only when you started or completed a specific quest.

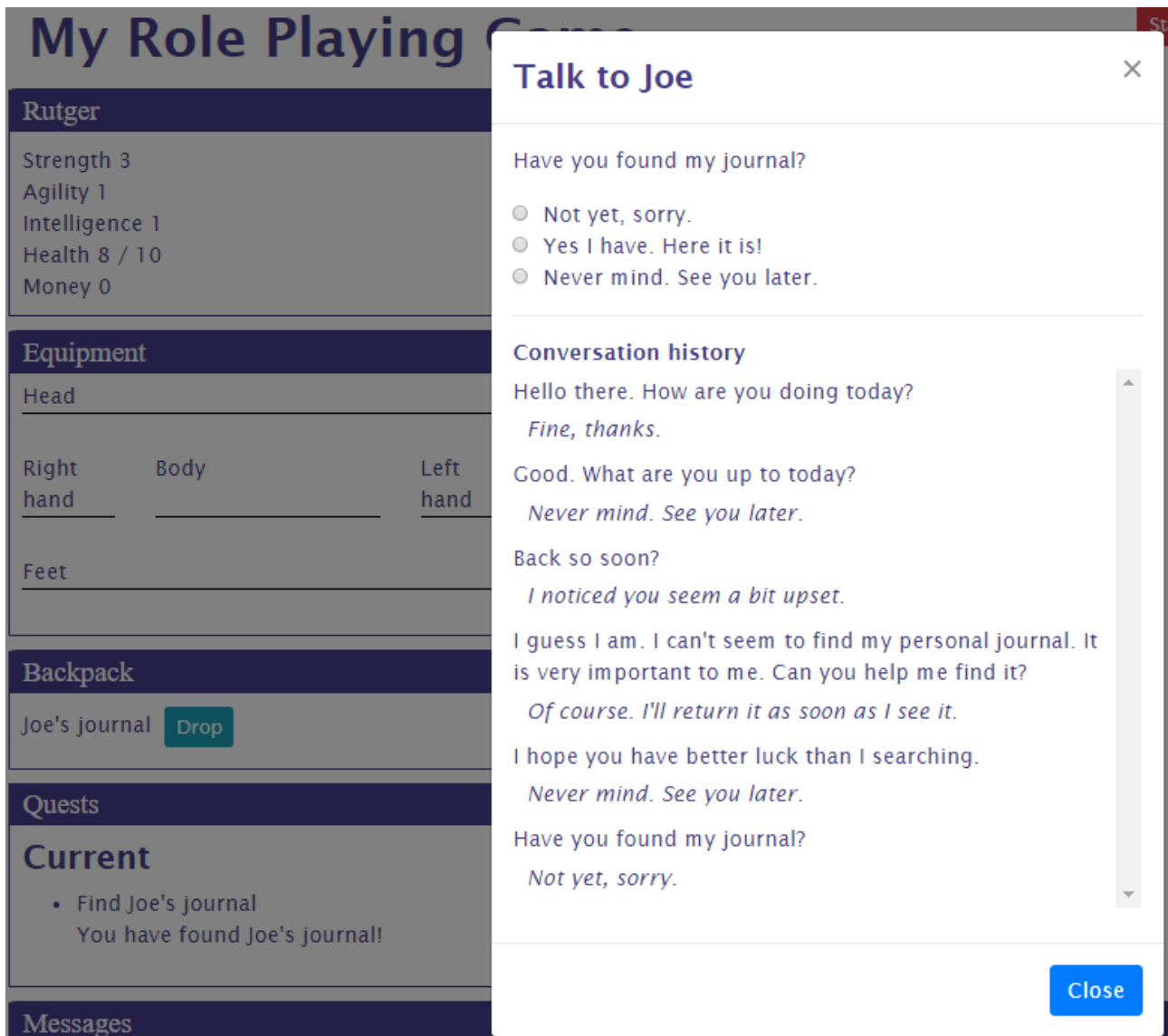
Now, we need add the quest to Joe in the **friend.ts** file:

```
},  
quests: [  
  Quests.Journal()  
]
```

Ok, so Joe has a quest for us and we can talk to him to give it to us. You can test all of that by building and running the game. But we still need to put his journal somewhere in the game world for the player to find it and complete the quest. Let's add it to the basement location:

```
name: 'Basement',  
destinations: [  
  {  
    name: 'To the garden',  
    target: Locations.Garden  
  }  
],  
items: [  
  Items.Journal()  
]
```

Now we have a nice quest ready for the player. He first has to talk to his friend and agree to help him. Then, he has to find the journal which is in the basement. To get in the basement, he needs a key. This key is in the possession of the bandit which he needs to defeat. Play the quest and return the journal to Joe. You should see something like this when you return to him:



Give Joe his journal and you'll earn 5, erm, money...

Note that when you need to track progress on one of your quests, you can use the quest progress object. It is not typed, so you can add anything to it that you need. You can also check in code whether a quest is done by checking its completed flag.

.22 *Fleshing out items and enemies*

You can also add images to enemies and items. To add an image to the bandit, open the **Bandit.ts** file and add the picture property like this:

```
namespace MyRolePlayingGame.Enemies {
  export function Bandit() {
    return Enemy({
      name: 'Bandit',
      picture: 'bandit.jpg',
      hitpoints: 10,
```

The **bandit.jpg** file needs to be present in the resources folder as well. Adding images to items works in the same way. Go out on the road. The bad guy should now have a face!

In order to give your items and enemies a bit more substance, you can also use an HTML file

instead of a plain text description and a picture. With the HTML file, you can make them as flashy as you want. Once you're using an HTML file, it makes little sense to have to specify a picture for your enemy separately as it is so easily added there. If you add an image tag with the 'picture' class, StoryScript will take that image and show it for the enemy (it works the same for items, note that here you do include the resources folder in the src):

```
TS bandit.ts    <> bandit.html x
1  
2  <description>
3    A bandit
4  </description>
```

Part 5. API

.23 *API*

TODO: document features unless this can be done well in code.