## Chapter 1





## × - rsilveira@carus: ~

File Edit View Search Terminal Help

```
rsilveira@carus:~$ node
> console.log('Hello, World!');
Hello, World!
undefined
>
```

```
* - [) rsilveira@carus: ~/formigone/html5multiplayer/ch2
File Edit View Search Terminal Help
rsilveira@carus:~/formigone/html5multiplayer/ch2$ node player_test.js
module.js:340
    throw err;
Error: Cannot find module 'player.js'
    at Function.Module._resolveFilename (module.js:338:15)
    at Function.Module._-load (module.js:280:25)
    at Module.require (module.js:364:17)
    at require (module.js:380:17)
    at Object.<anonymous> (/home/rsilveira/formigone/html5multiplayer/ch2/player
test.js:1:76)
    at Module. compile (module.js:456:26)
    at Object.Module._extensions..js (module.js:474:10)
    at Module.load (module.js:356:32)
    at Function.Module._load (module.js:312:12)
    at Function.Module.\overline{runMain (module.js:497:10)}
rsilveira@carus:~/formigone/html5multiplayer/ch2$
```

Chapter 3




```
    \square ch3
                            \square node_modules
                            \square snake-ch3
        \squarebbin
        \square node_modules
        \nabla public
            \square
                \squareimg
            \nabla js
                                    \mp@subsup{}{1/15}{1/2}\mathrm{ app. build.js}
        \square routes
        \nabla \square share
            Js, app.client.js
            |s fruit.js
            |
```



```
            |s renderer.js
            |S snake.js
        \square views
            Rl erroriade
            R⿴囗⿱一一⿴囗⿱一一日
                    目 layout.jade
            |s app.js
            |s
```



```
        JS, package.json
```

Input event（key press）


Render phase


$$
(x+=4 * 0.5) \quad(x+=4 * 0.5) \quad(x+=4 * 0.5) \quad(x+=4 * 0.5)
$$



$$
\begin{aligned}
& (x+=4 * 0.25) \quad(x+=4 * 0.25) \quad(x+=4 * 0.25) \quad(x+=4 * 0.25) \\
& (x+=4 * 0.25) \quad(x+=4 * 0.25) \quad(x+=4 * 0.25) \quad(x+=4 * 0.25) \\
& \begin{array}{|l|l|l|l|l|l|l|l|}
\hline \mathrm{x}=1 & \mathrm{x}=2 & \mathrm{x}=3 & \mathrm{x}=4 & \mathrm{x}=5 & \mathrm{x}=6 & \mathrm{x}=7 & \mathrm{x}=8 \\
\hline
\end{array}
\end{aligned}
$$




| $60 \mathrm{fps} \rightarrow$ speed $=0.31 \mathrm{px}$ |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| (every 16.66ms) | 0 | 5px | 10px | 15px | $\ldots$ | 300px |
|  | 01 |  | 2 | 3 |  | 60 |
| 10 fps (every 100ms) |  | 0 | 30 px |  | $\ldots$ | 300px |
|  | 0 |  | 1 |  | 10 |  |



| current position |  |  |  |  | target position | $A=(1-t) B+t C$ |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  | $\mathrm{X}_{1}$ | $Y_{1}$ | $\mathrm{X}_{2}$ | $Y_{2}$ | t |
|  |  |  |  |  |  | 0 | 5 | 5 | 12 | 8 |  |
|  | $(5,5)$ |  |  | 1 |  | 6.4 | 5.6 | - | 0.2 |  |
|  |  |  |  |  |  |  | 1 |  |  |  |  |  |
|  | 1 | 2 |  |  | $7$ | 2 | 8.64 | 6.56 |  |  | 0.4 |
|  |  |  |  |  |  | 3 | 10.65 | 7.42 |  |  | 0.6 |
|  |  |  | 3 |  | $\downarrow$ |  |  |  |  |  |  |
|  |  |  |  | 4 |  | 4 | 11.23 | 7.88 |  |  | 0.8 |
|  |  |  |  |  |  | 5 | 12 | 8 |  |  | 1.0 |
|  |  |  |  |  | (12,8) |  |  |  |  |  |  |
|  |  |  |  |  |  |  | 5 fram | es $\Rightarrow$ | $\mathrm{t}_{1}=1$ | $5=$ |  |
|  |  |  |  |  |  |  |  |  | $\mathrm{t}_{2}=2$ | = |  |

Chapter 5





(⿴囗 WebRTC-Web devel... © WebRTC: peer-to-pe... ढ WebRTC: peer-to-pe... © Developer Tools -htt...


## MEbRTC: paer-to-pater chat

```
[anomymous] v=0
0=- 8565569124838920274 2 IN IP4 127.0.0.1
s=-
t=0}
a=group:BUNDLE data
a=msid-sementic: HMS
m=application 9 RTP/SAUPF 101
c=IN IP4 0.0.0.0
b=9S:30
a=r'tcp:9 IN IP4 0.0.0.0
a=ice-ufr`g: hL7uZsGbr-FJoBbB\
a=ice-pud: ZoDSoz5P7ITGrGRDNYPXVRkN
a=ice-options:google-ice
a=fingerprint:sha-256 7F:D6: 1E:4E:3E:6B:07:C4:F5:0A:3E:7B
a=setup: actpass
a=mid:data
```

:offer



