



Forget the PS5

I've got a PDF 2.0



PDF 2.0



Who am I?

- ≡ Michaël Demey
- ≡ Proud Father
- ≡ Software Developer
 - ≡ iText employee since 2011
- ≡ Gamer
- ≡ @MyMilkedEek

What is Game Development

What are games?

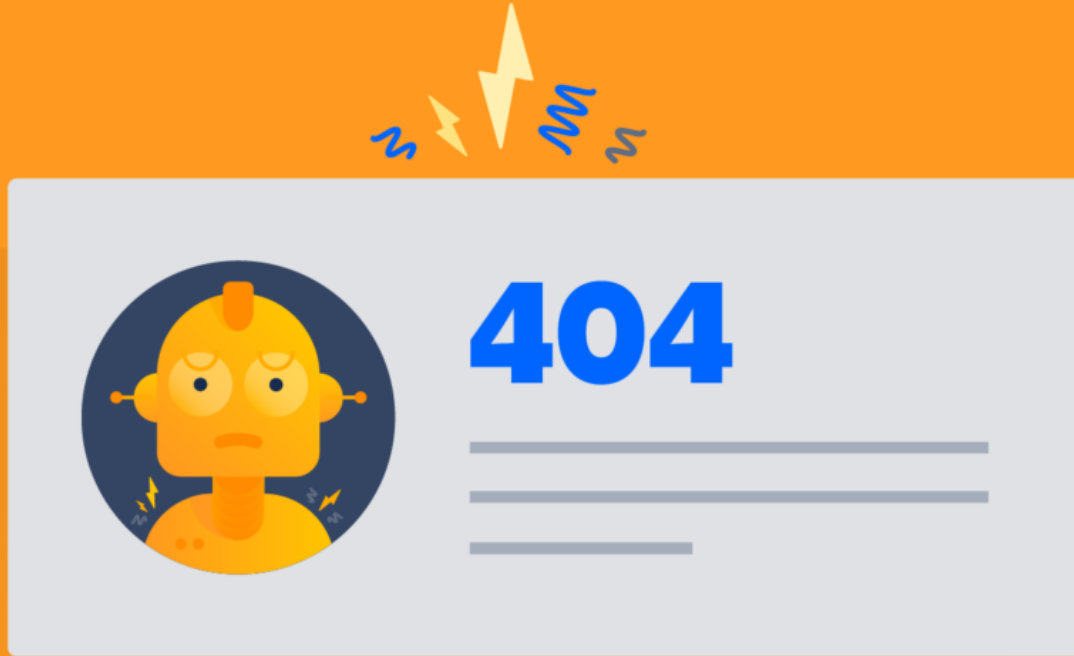
Interactive Media



Why hasn't anyone made a game in PDF yet?



Missing features



Incompatible Tooling



But most obviously

Not *really* meant to be a gaming platform

So, why did I do this?





First Idea

5	3			7				
6			1	9	5			
	9	8					6	
8				6				3
4			8		3			1
7				2				6
	6					2	8	
			4	1	9			5
				8			7	9

Sudoku!

- ≡ 2 approaches
 - ≡ Hardcoding
 - ≡ Evaluate the entered numbers



```

function valid(arraySolution) {
    for (var y = 0; y < 9; ++y) {
        for (var x = 0; x < 9; ++x) {
            var value = arraySolution[y][x];

            if (value) {
                // Check the line
                for (var x2 = 0; x2 < 9; ++x2) {
                    if (x2 != x && arraySolution[y][x2] == value) {
                        return false;
                    }
                }

                // Check the column
                for (var y2 = 0; y2 < 9; ++y2) {
                    if (y2 != y && arraySolution[y2][x] == value) {
                        return false;
                    }
                }

                // Check the square
                var startY = Math.floor(y/3)*3;
                for (var y2 = startY; y2 < startY + 3; ++y2) {
                    var startX = Math.floor(x/3)*3;
                    for (x2 = startX; x2 < startX + 3; ++x2) {
                        if ((x2 != x || y2 != y) && arraySolution[y2][x2] == value) {
                            return false;
                        }
                    }
                }
            }
        }
    }

    return true;
}

```

You can even make it look pretty

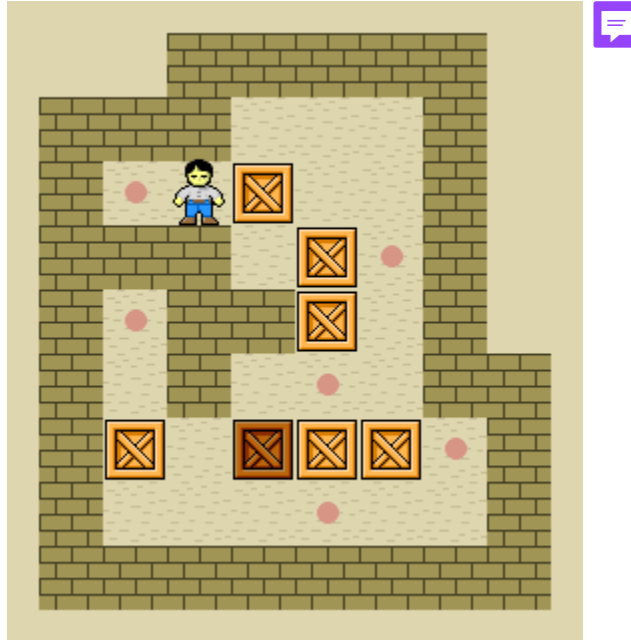
							8	
6	8		4	7			2	
	1	9	5		8	6	4	7
	6		9					4
3	4	2	6	8				
1	9			5		8	3	
			7	2		4		3
		6			5		1	
		3	8	9	1	5		

Wasn't that a bit *too easy*?

- ≡ Where's the game loop?
- ≡ Why can't I just print this and fill this out when I want to?



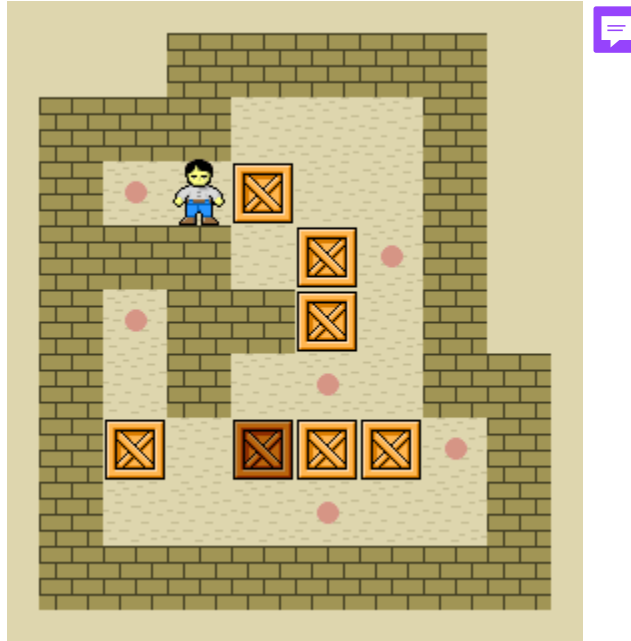
Sokoban!



Roadbumps



Moving Images!



Form fields!

- JavaScript allows you to manipulate the bounding box of a form field



How you move buttons in JS

```
var player = this.getField("player");
```

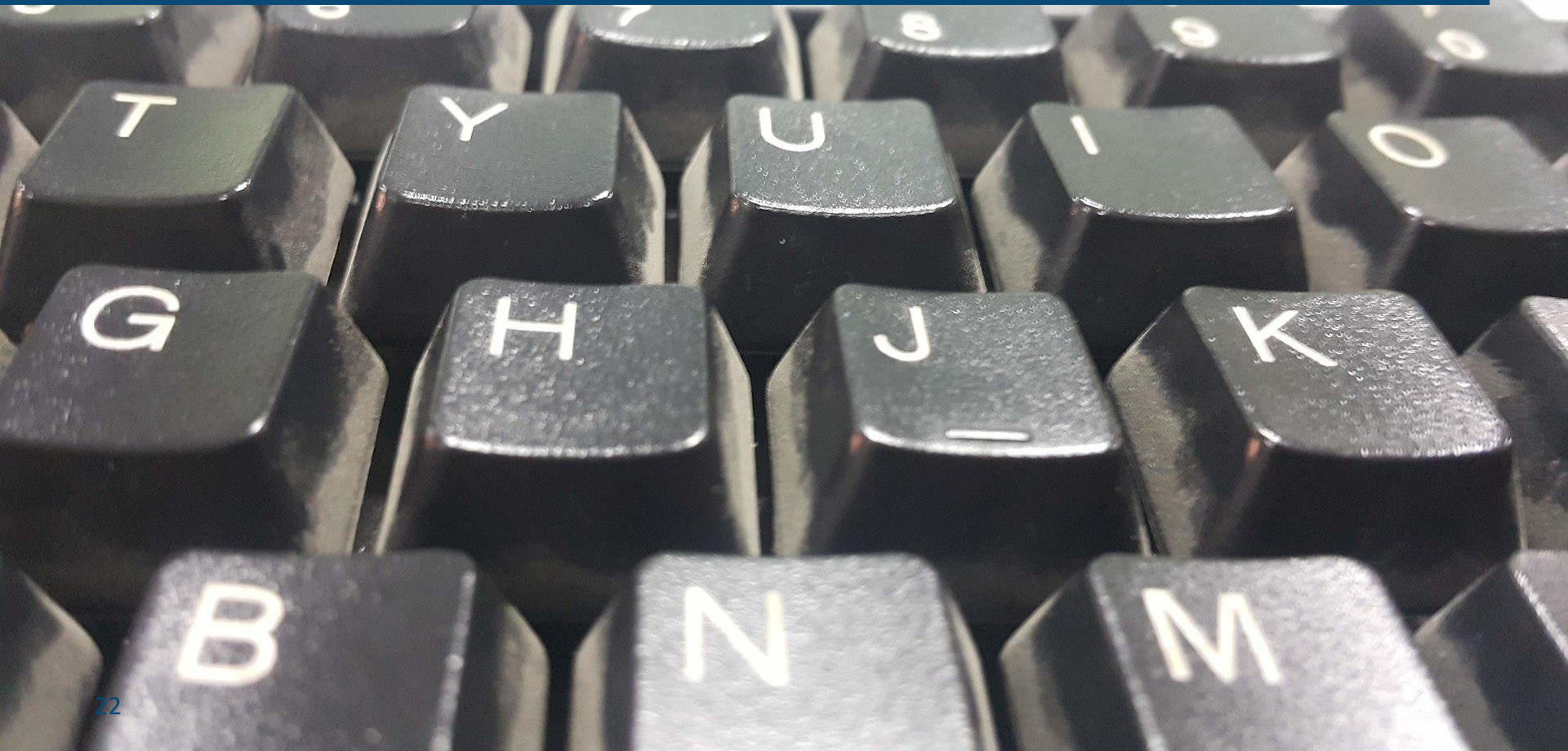
```
var rect = player.rect;
```

```
rect[0] += 20;
```

```
rect[2] += 20;
```

```
player.rect = rect;
```


Keystroke?



Requesting Focus



How to request focus

```
this.getField(\"Controls\").setFocus();  
app.fullscreen = true;
```


Tying Up Loose Ends

- ≡ Easy stuff remains to finish the game
 - ≡ Collision detection
 - ≡ Victory Condition check
 - ≡ Level progression

Levels



Example of Programmer's art

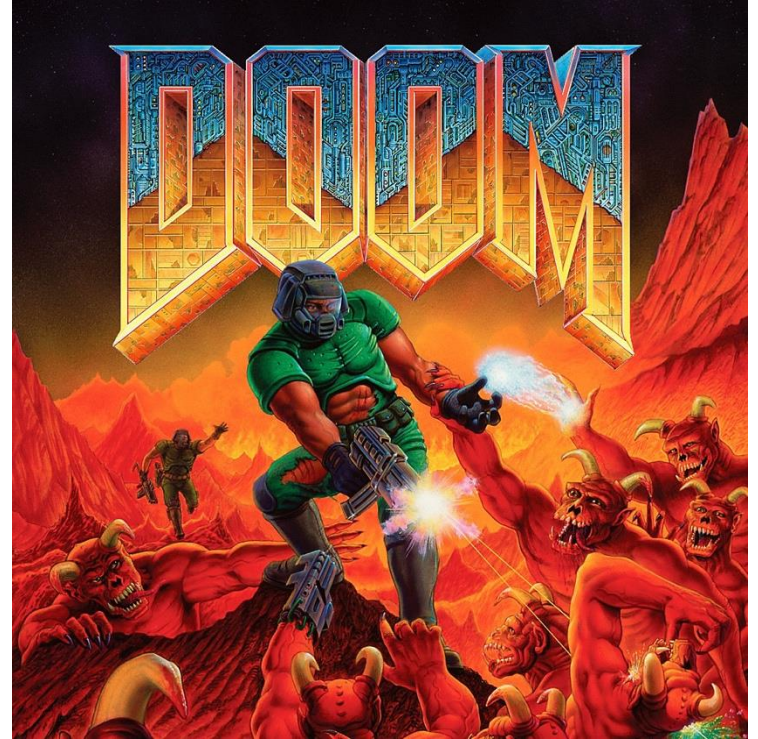


Road Ahead



DOOM

- ≡ Benchmark for any system
- ≡ Approach
 - ≡ Write an emulator in JS
 - ≡ “Screen” is a grid of buttons
 - Simulating pixels
 - This grid will render the game
 - ≡ Figure out sound/music



≡ How to create these PDFs

Who we are

iText is a leading technology company active in the digital documents space

Flagship product

Open source software libraries to create and manipulate PDF documents in Java and .NET (C#).
Developed in 2000, commercially available since 2008.

Customers

There are currently millions of iText users, both open source and commercial.

- ≡ Software developers, technology vendors, software integrators, but also
- ≡ Financial, public, government and health care sectors including many of the Fortune 500 companies.



iText portfolio

Enterprise-grade PDF library



iText 7 Suite

SDK for PDF processing, PDF/A & PDF/UA creation, digital signing, security, data extraction, OCR, HTML conversion, redaction, Acroforms, XFA flattening, rendering of PDFs as images, language capabilities, typographic features, and much more.

Low-code technology



iText DITO

- ≡ Fast template-based document generation
- ≡ Template designer
- ≡ Conditional content
- ≡ Data binding, and
- ≡ Much more

How did I use iText in creating the games?

- ≡ Polyvalent API
 - ≡ Convenience → High Level API
 - ≡ Very customizable → Fine tune on a syntax level
- ≡ Customize the PDF as I want it
- ≡ Insert Javascript

What is a PDF Action?

- ≡ A Javascript function that can be triggered by an event
 - ≡ Similar to HTML/JS triggers onSubmit, etc.
- ≡ Can be placed on a lot of levels

Creating PDF Actions with iText

```
PdfAction.createJavaScript(  
    "var player = this.getField(\"player\"); var rect = player.rect; rect[0] += 20; rect[2] += 20; player.rect = rect;"  
)
```

Attaching Javascript to a Field

```
PdfTextFormField controls = PdfFormField.createText(  
    pdfDocument, new Rectangle(0, 0, 200, 200),  
    "Controls", ".");
```

```
controls.setAdditionalAction(PdfName.K,  
    PdfAction.createJavaScript(javascript));
```

```
PdfAcroForm form = PdfAcroForm.getAcroForm(pdfDocument, true);  
form.addField(controls);
```

Removing JavaScript from a PDF

```
PdfAcroForm acroForm =  
    PdfAcroForm.getAcroForm(pdfDocument, false);  
  
PdfFormField fieldWithJavascript =  
    AcroForm.getField("fieldWithJavascript");  
  
fieldWithJavascript.setAdditionalAction(PdfName.K, null);
```

More convenient solutions

```
File htmlSource = new File("input.html");  
File pdfDest = new File("output.pdf");  
  
ConverterProperties converterProperties = new ConverterProperties();  
  
HtmlConverter.convertToPdf(  
    new FileInputStream(htmlSource),  
    new FileOutputStream(pdfDest),  
    converterProperties);  
}
```

iText DITO



<http://dito.online>
online demo

 Q&A

Many thanks!