



# Re-Doing Papyrus

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# La Famille Papyrus

- Papyrus family WAS a successful french ludo-educative game
  - « WAS » because it doesn't work with recent systems (MacOS and Windows), due to a problem in detecting the Quicktime module
  - Designed by Virginie Clayssen and realised with Macromedia Director





## What about SVG?

- **Is it possible to do a game such Papyrus with SVG?**
  - Animation performances?
  - Interactions
- **How can we implement a game such Papyrus with SVG?**
  - Animations
  - Interactions
- **And what about SVG on mobiles**



# Samples

- **Original starting sequence**
  - File Demo/Start.mov (quicktime; click play; with sound)
- **Starting sequence in GPAC, SVG Tiny 1.2**
  - File Demo/Papyrus1.2T.svg
- **Same sequence in Opera**
- **Same sequence in Chrome**
- **Starting sequence in Firefox**
  - File Demo/Papyrus1.1F.svg
  - Animated by script



# Scan and vectorize the drawings





## Original scans

### ■ Original game

- Targeted resolution: 512x373, 256 colors
- Bitmap animation

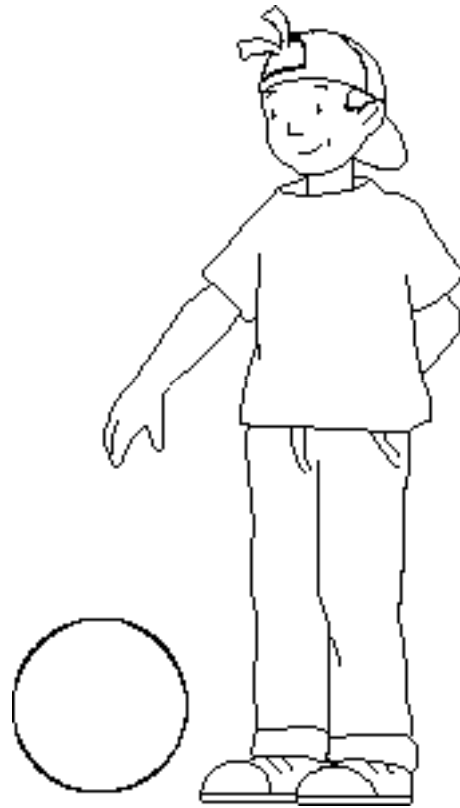
### ■ But

- Choice to scan at 1800x1200 resolution
- ... to maintain the very best quality as long as it is reasonably feasible

# Samples



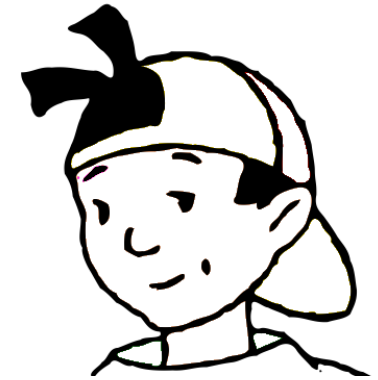
Original scan



Drawing in the  
Original game  
And detail

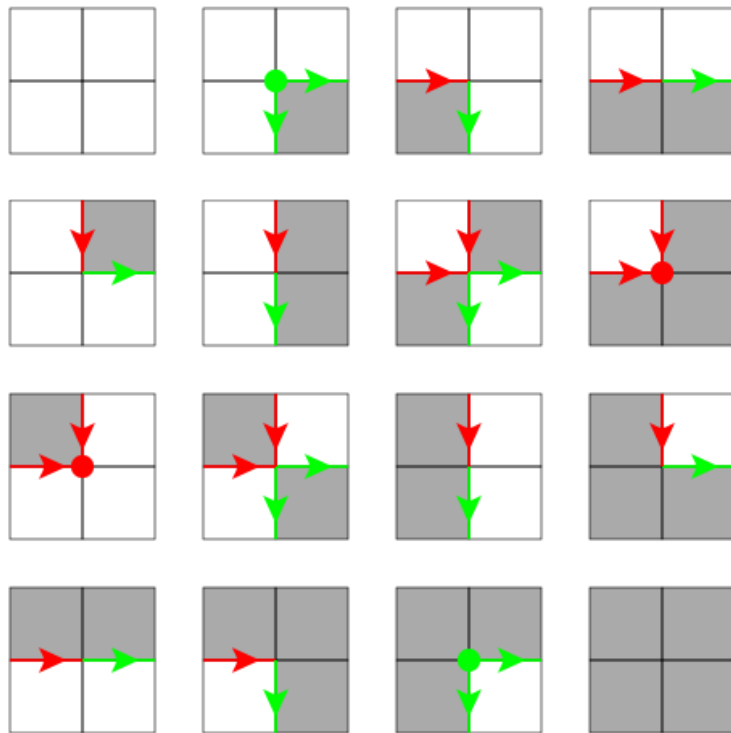


Corresponding SVG  
And zoom



# Vectorizing

- Analyze each successive line pair
- Use a pattern matching for each 2x2 block



- Green points are starting points for two chunks of path
- Red points are ending points for two chunks of path
- Green arrows are new segments in a chunk of path, starting either from a starting point (green) or from a previous segment in the path (red arrow)





# Assembling the drawings to animate them



# Cartoon animation isn't parametric animation



three successive drawings from a cartoon sequence by Preston Blair

The second can't be interpolated from the first and the third

# Exposure sheet

Scan of an exposure sheet

| COMPT. | Kea | B  | Aug | B            | Em. | B            | Th. |
|--------|-----|----|-----|--------------|-----|--------------|-----|
| 1      | 1   | 1  | 1   | <del>1</del> | 1   | <del>1</del> | 1   |
| 2      | 1   | 1  | 1   |              | 1   |              | 1   |
| 3      | 1   | 1  | 1   |              | 1   |              | 1   |
| 4      | 1   | 1  | 1   |              | 1   |              | 1   |
| 5      | 1   | 1  | 1   |              | 1   |              | 1   |
| 6      | 1   | 1  | 1   |              | 1   |              | 1   |
| 7      | 1   | 1  | 1   |              | 1   |              | 1   |
| 8      | 1   | 1  | 1   |              | 1   |              | 1   |
| 9      | 1   | 1  | 1   |              | 1   |              | 1   |
| 10     | 1   | 1  | 1   |              | 1   |              | 1   |
| 1      | 1   | 2  | 1   |              | 1   |              | 1   |
| 2      | 1   | 3  | 1   |              | 1   |              | 1   |
| 3      | 1   | 4  | 1   |              | 1   |              | 1   |
| 4      | 1   | 5  | 1   |              | 1   |              | 1   |
| 5      | 1   | 6  | 1   |              | 1   |              | 1   |
| 6      | 1   | 7  | 1   |              | 1   |              | 1   |
| 7      | 1   | 8  | 1   |              | 1   |              | 1   |
| 8      | 1   | 9  | 1   |              | 1   |              | 1   |
| 9      | 1   | 10 | 1   |              | 1   |              | 1   |
| 20     | 1   | 1  | 1   |              | 1   |              | 1   |
| 1      | 1   | 2  | 1   |              | 1   |              | 1   |
| 2      | 1   | 3  | 1   |              | 1   |              | 1   |
| 3      | 1   | 4  | 1   |              | 1   |              | 1   |
| 4      | 1   | 5  | 1   |              | 1   |              | 1   |
| 5      | 1   | 6  | 1   |              | 1   |              | 1   |
| 6      | 1   | 7  | 1   |              | 1   |              | 1   |
| 7      | 1   | 8  | 1   |              | 1   |              | 1   |
| 8      | 1   | 9  | 1   |              | 1   |              | 1   |
| 9      | 1   | 10 | 1   |              | 1   |              | 1   |
| 30     | 1   | 1  | 1   |              | 1   |              | 1   |

## ■ A sample of our corresponding XML format

```

<fexp version="2.0">
  <level cycle="indefinite">
    <image duration="0.960">A0000.svg</image>
  </level>
  <level cycle="indefinite">
    <image duration="0.120">B0001.svg</image>
    <image duration="0.120">B0002.svg</image>
    <image duration="0.120">B0003.svg</image>
    <image duration="0.120">B0004.svg</image>
    <image duration="0.120">B0005.svg</image>
    <image duration="0.120">B0006.svg</image>
    <image duration="0.120">B0007.svg</image>
    <image duration="0.120">B0008.svg</image>
  </level>
</fexp>

```

# Images from the previous exposure sheet



Demo: animated sequence  
File Demo/augustin.svg

Possible player: GPAC, Opera,  
Chrome, Safari  
Choose one

# Animating the drawings: method 1

- a pair of `<set>` elements for each drawing, one to display it, one to remove it

```
<g id='level0cell2' display='none' >
```

```
<!-- display →
```

```
<set id='l0c2' attributeName='display' to='inline'  
begin='l0c1.end' dur='0.08s'/>
```

```
<!-- remove →
```

```
<set attributeName='display' to='none'  
begin='l0c2.end'/>
```

```
<!-- ...the elements which define the drawing must be  
included here -->
```

```
</g>
```

## Animating the drawings: method 2

- with `<animate>`
- By default the effect of the `<animate>` ends by returning to the default state of the group (`display="none"`)

```
<g id="lev0c1">
```

```
  <animate id="l0c1" attributeName="display"
  from="inline" to="inline" calcMode="discrete"
  begin="l0c0.end" dur="0.16s" />
```

```
<!-- ...the elements which define the drawing must be
  included here -->
```

```
</g>
```

# Animating the drawings: method 3

## ■ Scripting

- Drawback: consume a lot of CPU
- Idea: modify the display attribute by script
- Schedule: use of setTimeout

## ■ Extract

```
cell =  
    document.getElementById(girlAnim[step].name);  
    cell.setAttributeNS(null, "display", "inline");  
setTimeout("nextGirlStep(""+step+"")",girlAnim[step]  
    .dur);
```



# Adding interactivity







# IDA File Format

## ■ IDA

- Interactivity Description for Animation

## ■ A format to describe

- Events which produce the load of new file (hyperlinks)
- Events which produce a change in the current scene

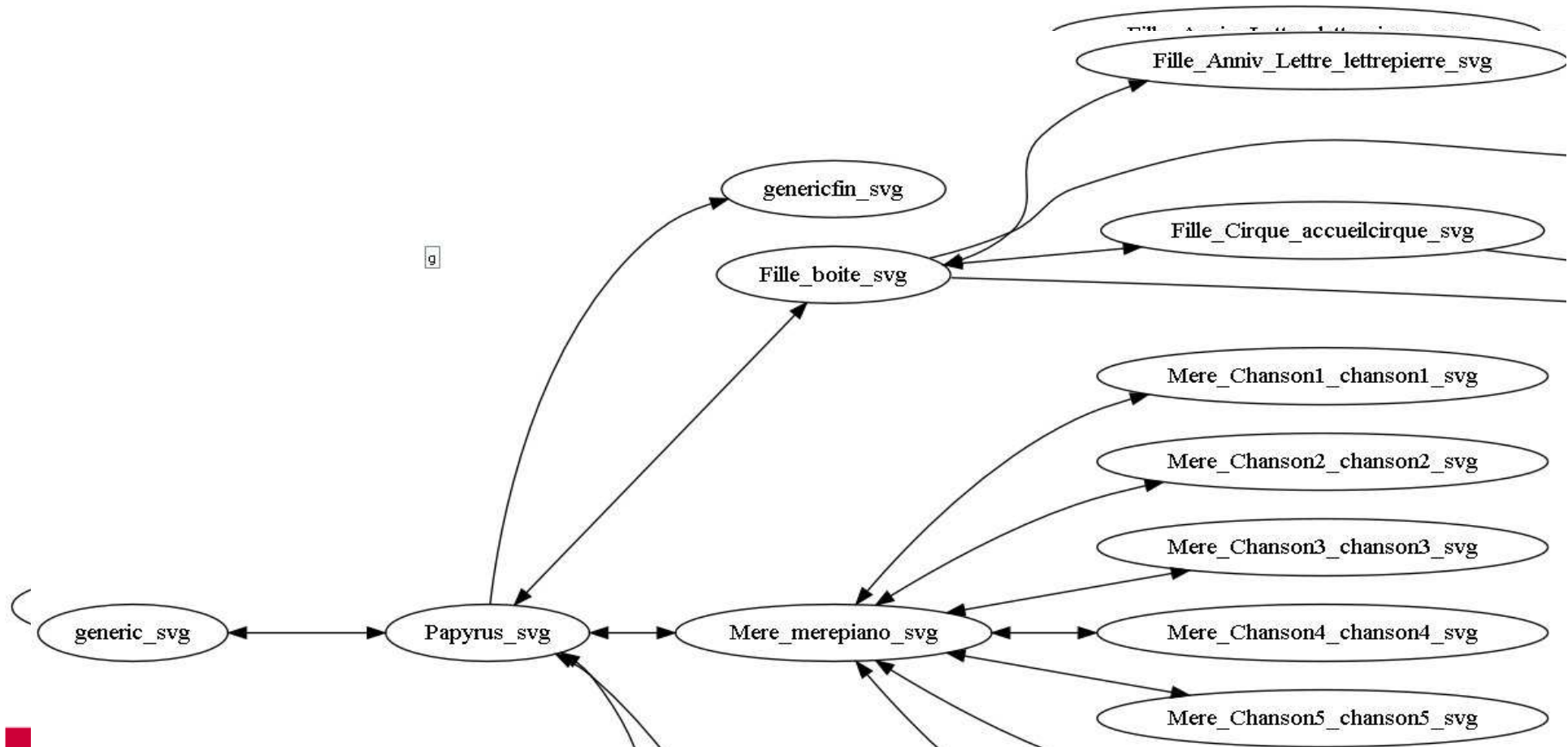
## ■ Complete format definition is a work in progress

## Extract of an IDA file

```
<scene src="Papyrus.svg" onend="Papyrus.svg">  
  <listener target="porte" nextpage="generic2.svg" event="click" type="out" />  
  <listener target="porte" nextpage="porteouverte" event="mouseover" />  
  <listener target="lea" nextpage="Fille/boite.svg" event="click" type="out" />  
  <listener target="mere" nextpage="mother.svg" event="click" type="out"/>  
  <listener target="gars" nextpage="chambre.svg" event="click" type="out" />  
  <listener target="pere" nextpage="photo.svg" event="click" type="out" />  
  <listener target="notes" nextpage="generic.svg" event="click" type="out" />  
</scene>
```

# Flowchart of 'external' interactivity

- Sample of use of the IDA file to generate a flowchart, which helps to check the description





# Current results





# Players

## Significative parts of the game tested in

### ■ GPAC

- Windows and Windows mobile version

### ■ Opera 9

### ■ Chrome 2

### ■ Safari

### ■ Firefox

- With animation by script

## ■ Example: starting sequence of the game

|                                                 |         |
|-------------------------------------------------|---------|
| Original MOV                                    | 1830 KB |
| Uncompressed SVG                                | 2417 KB |
| Compressed SVG                                  | 616 KB  |
| Elementary drawings used to define the sequence | 51      |
| Path count                                      | 1324    |
| Points                                          | 335612  |
| Frames per second in GPAC (Windows)             | 30      |

# CPU

| Playing                             | in original size<br>(512x373)<br><br>CPU | Full screen (1280x800)<br><br>CPU |
|-------------------------------------|------------------------------------------|-----------------------------------|
| Original MOV in<br>Quicktime player | 3.00%                                    | 3.00%                             |
| SVG in Osmo4 (GPAC)                 | 7.00%                                    | 13.00%                            |
| SVG in Opera 9                      | 20.00%                                   | 29.00%                            |
| SVG in Safari                       | 28.00%                                   | 35.00%                            |
| SVG in Chrome                       | 18.00%                                   | 24.00%                            |
| SVG in Firefox(script)              | 40.00%                                   | 50.00%                            |

On a Toshiba portable running Windows XP SP3, with an Intel Core2 Duo P8600 at 2.4 GHz with 2.86 GB of RAM

- **Tests on some mobile phones running Windows Mobile**
  - Samsung i780
  - Glofish V900
- **Tests with GPAC**
- **For example, the starting sequence of Papyrus**
  - plays at 16 fps,
  - consuming 90% of CPU (on Glofish)
  - we need to understand why the loading time of each sequence is too high





## Comments on 'external use'





## External use

- **<use> element with external reference**
- **Very practical for cartoon animation**
- **Limited by the Tiny 1.2 specification**
  - « **the referenced fragment must not contain scripting, hyperlinking to animations or any externally referenced 'use' or 'animation' element** »
- **A file with 'external use' can't reference a file with 'external use'**
  - You need to know that what is referenced doesn't contain external references



## Sample: Starting sequence

### ■ Four levels

- Interactivity is added to an animated sequence
- The animated sequence is composed of a background and several elementary animations
- Each elementary animation is composed of several drawings
- The elementary drawings

### ■ The <use> element is very practical to maintain each level accessible;

- To change an elementary drawing
- To modify a timing in an animation
- To change the layout of the whole scene



## Bypassing the problem

- **To bypass the problem we have**
  - defined animations with the `<use>` element and external references
  - Created a tool to resolve the external references
    - It replace each `<use>` with external reference by a `<g>` containing the referenced elements



# Conclusion



## SVG is good for 2D animated games

- **SVG is very close to being playable on a lot of platforms**
  - we need sound on all platforms
    - available for GPAC
    - available for Opera (ogg format)
  - we need SVG animation in Firefox
- **With the GPAC player, SVG Tiny 1.2**
  - offers all the visual and interactive capabilities we need for Papyrus
  - works on Windows, Linux, Macintosh, Windows Mobile



## Final demo

### ■ Starting sequence

- Play with GPAC the file Demo/Papyrus1.2T.svg
- Click to the note, then quickly anywhere
- Click to the boy
- Click to the door
- Click to the boy
- Click to the robot
- Click to the first button (several)
- Click to the second button (several)