



Haute école d'ingénierie et d'architecture Fribourg
Hochschule für Technik und Architektur Freiburg

Systemes Numériques 2

Projet Flappy Bird

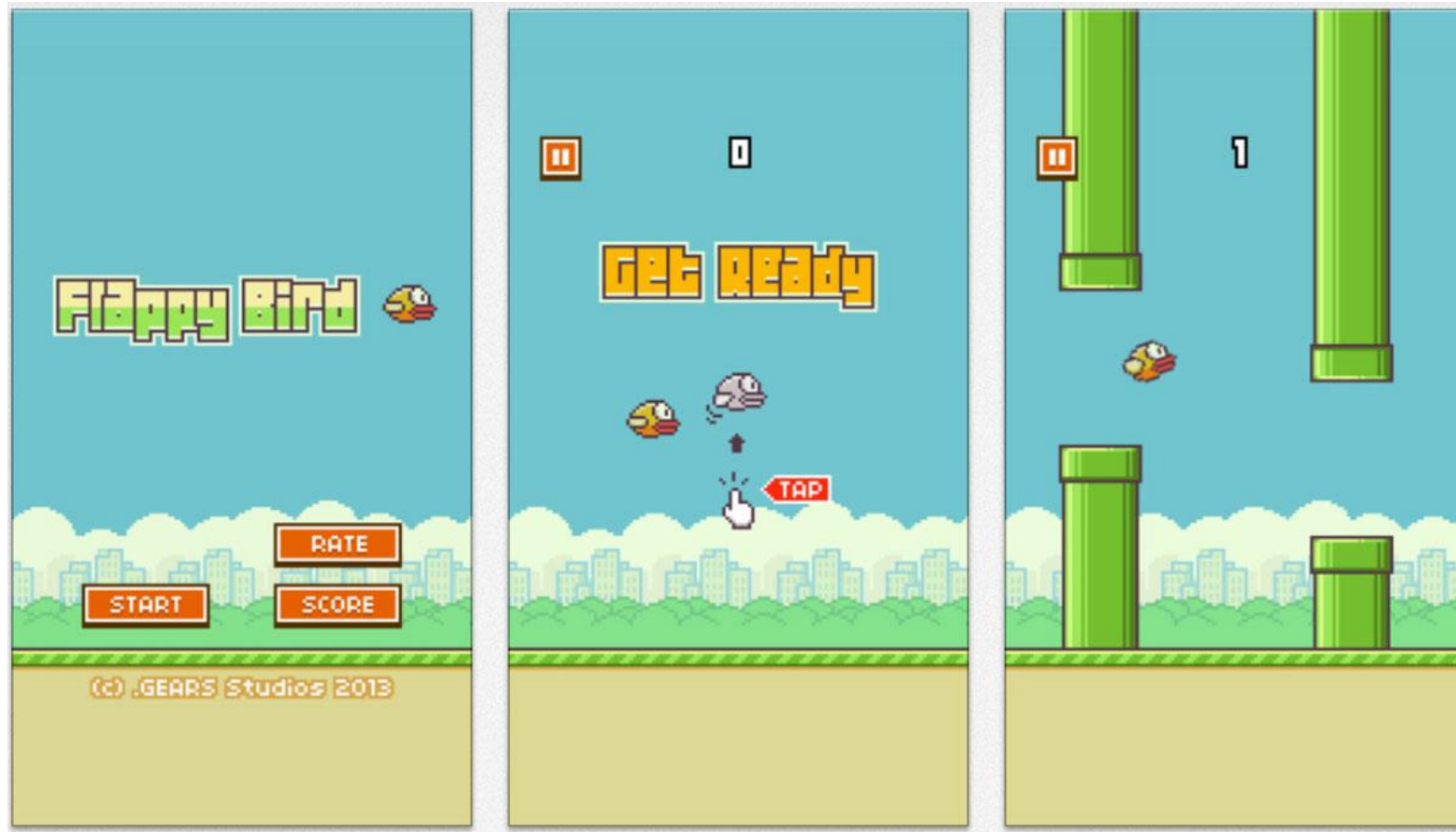
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23 JUIN 2016

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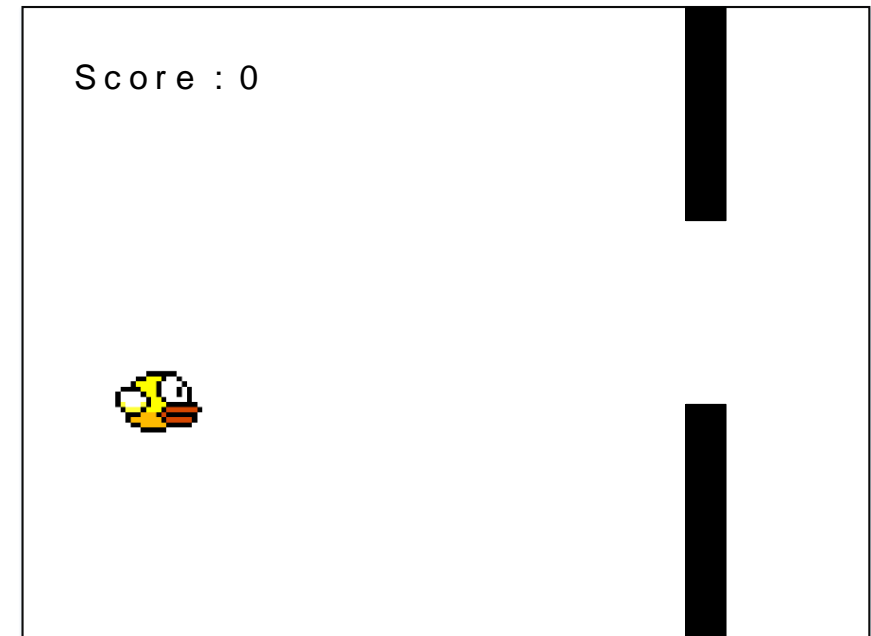
Introduction



<http://cdn-uploads.gameblog.fr/images/blogs/26083/176572.jpg>

Analyse

- Fonctionnalités de bases
- Fonctionnalités optionnelles
- Maquettes



Analyse - Déroulement d'une partie

Flappy Bird

Instructions :

Click left to jump

Avoid obstacles

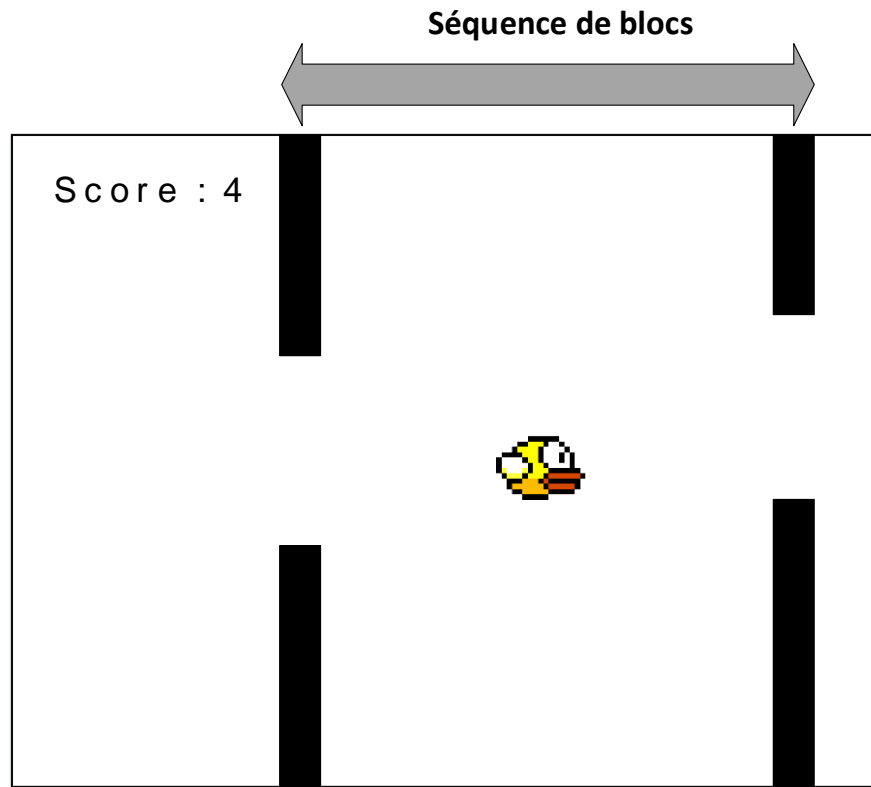
Enjoy !

Click left to
start

Score : 0



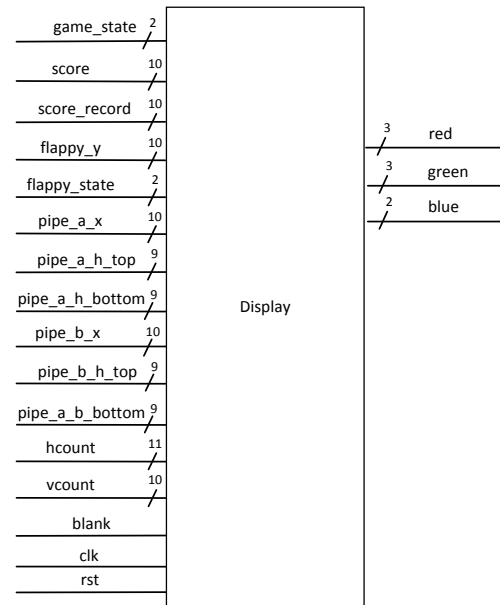
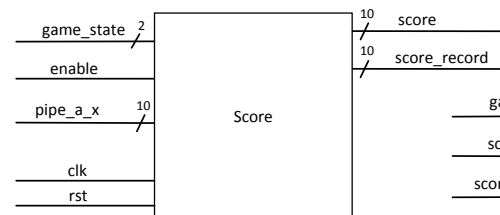
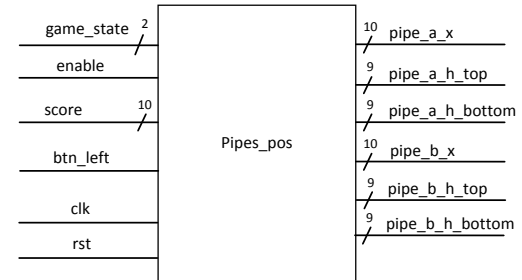
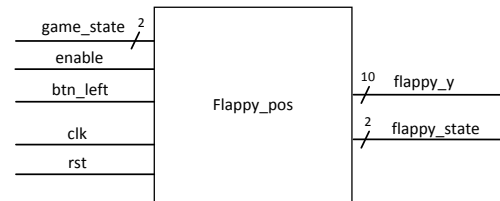
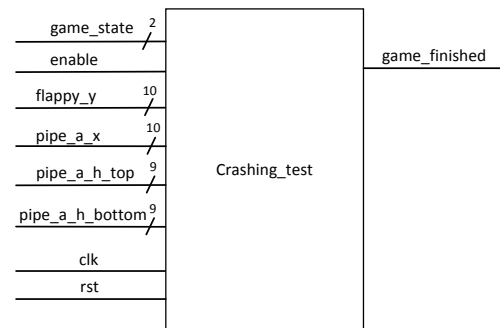
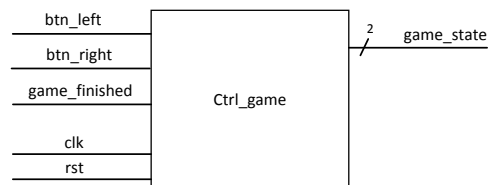
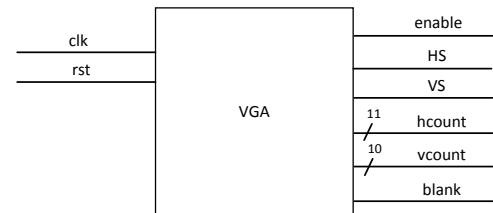
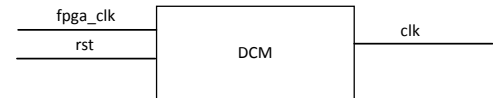
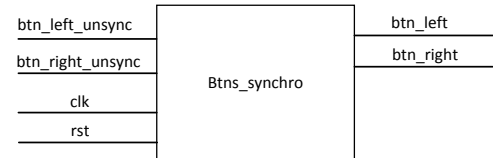
Analyse - Déroulement d'une partie (2)



Conception

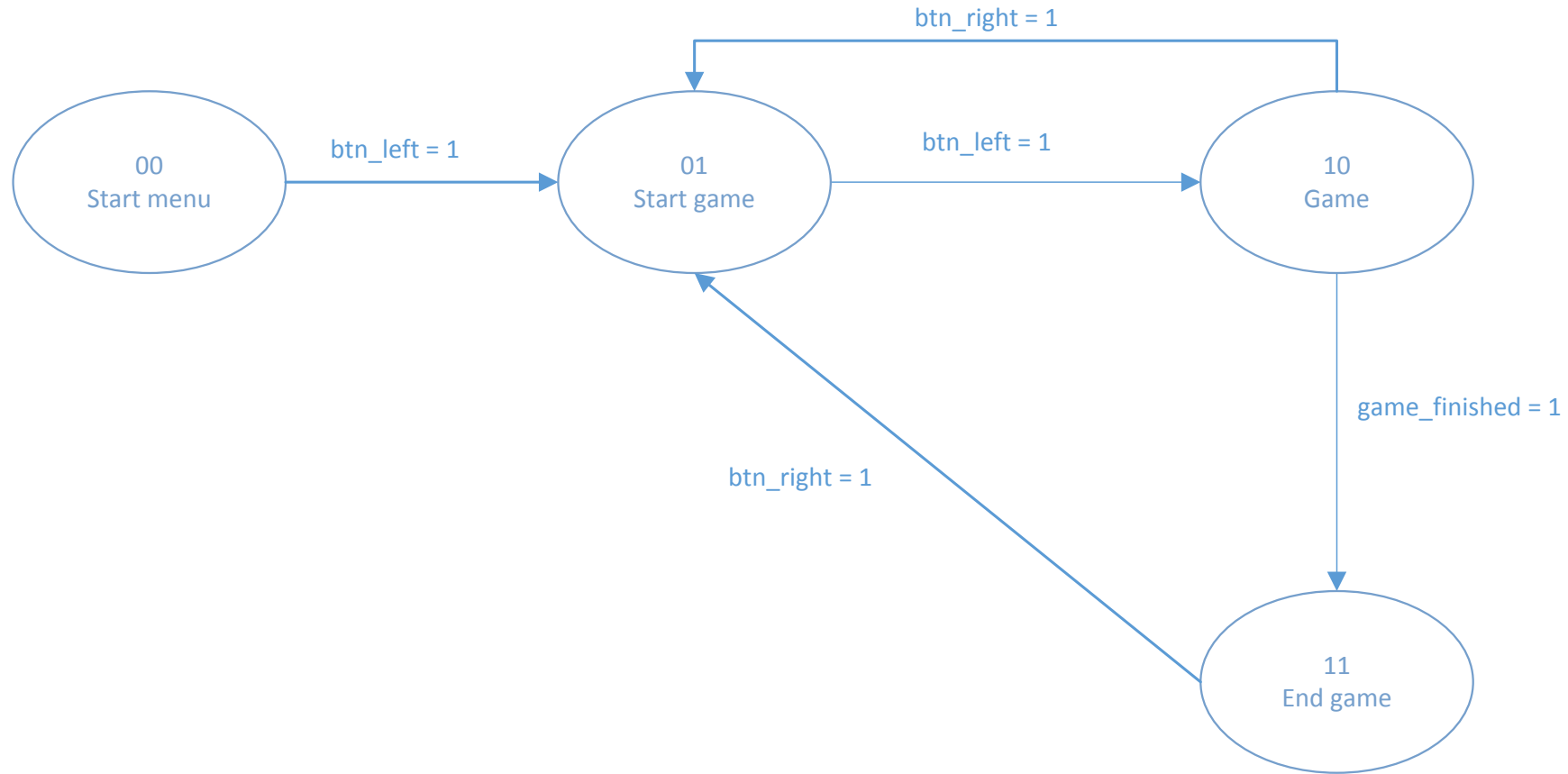
- Composants
 - DCM
 - VGA
 - Btns_synchro
 - Ctrl_game
 - Flappy_pos
 - Pipes_pos
 - Score
 - Crashing_test
 - Display
- Package local

btn_left_unsync
btn_right_unsync
fpga_clk
rst



HS
VS
red (3 bits)
green (3 bits)
blue (2 bits)

Conception - Game controller

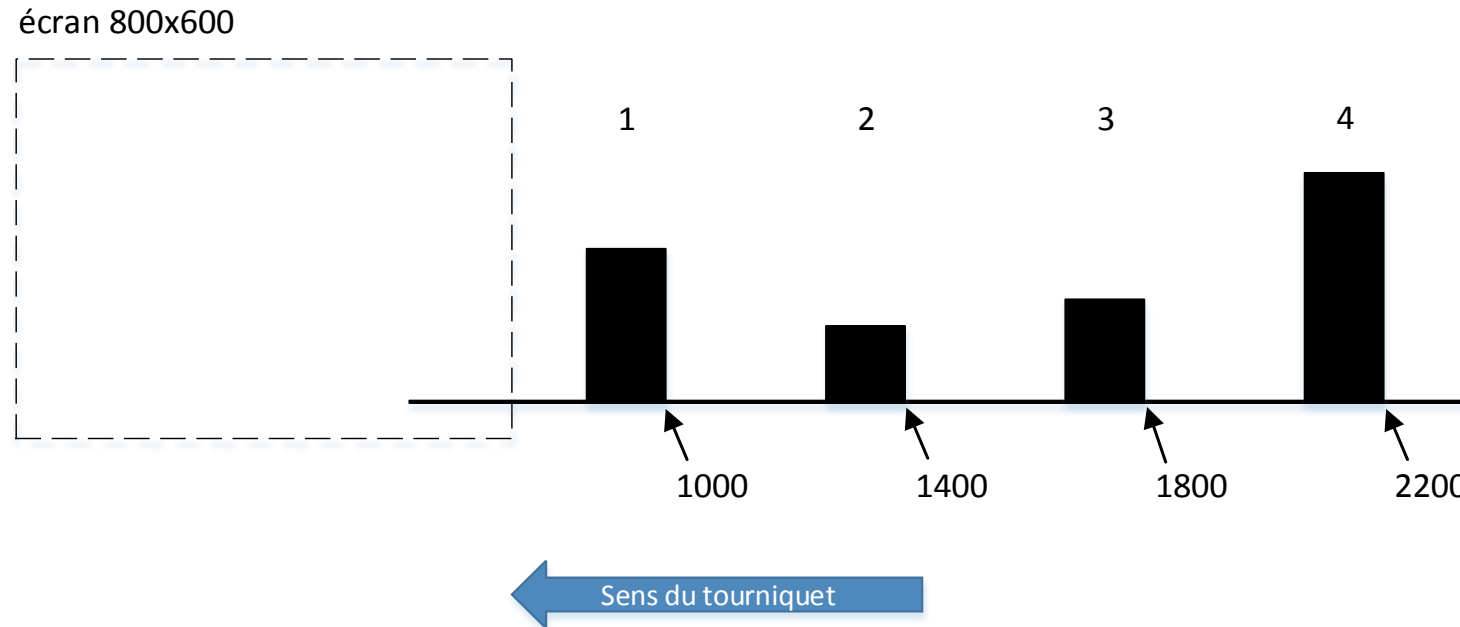


Conception - Flappy position

- Calcul de la position (coordonnée y)
- Etat (rising / falling)

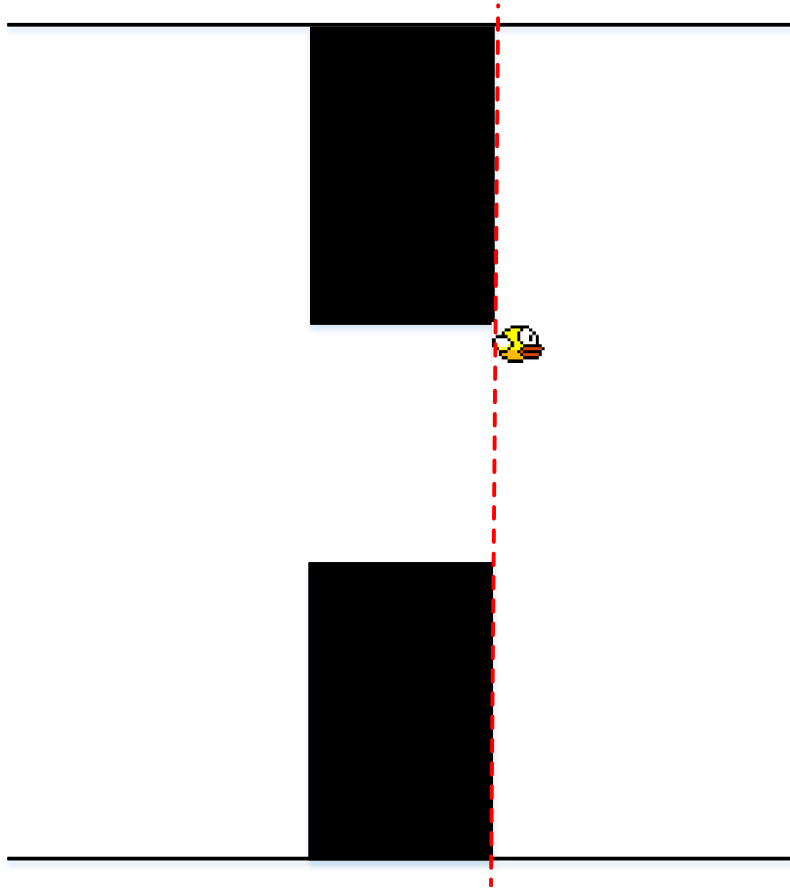
```
if (btn_left == 1) {  
    for(int i = 0; i < nbr_incr; i++){  
        y++;  
    }  
}else{  
    y--;  
}
```

Conception - Pipes position



$$\begin{aligned} pipe_{top} &= random; \\ pipe_{bottom} &= HAUTEUR_ECRAN - (random + space); \end{aligned}$$

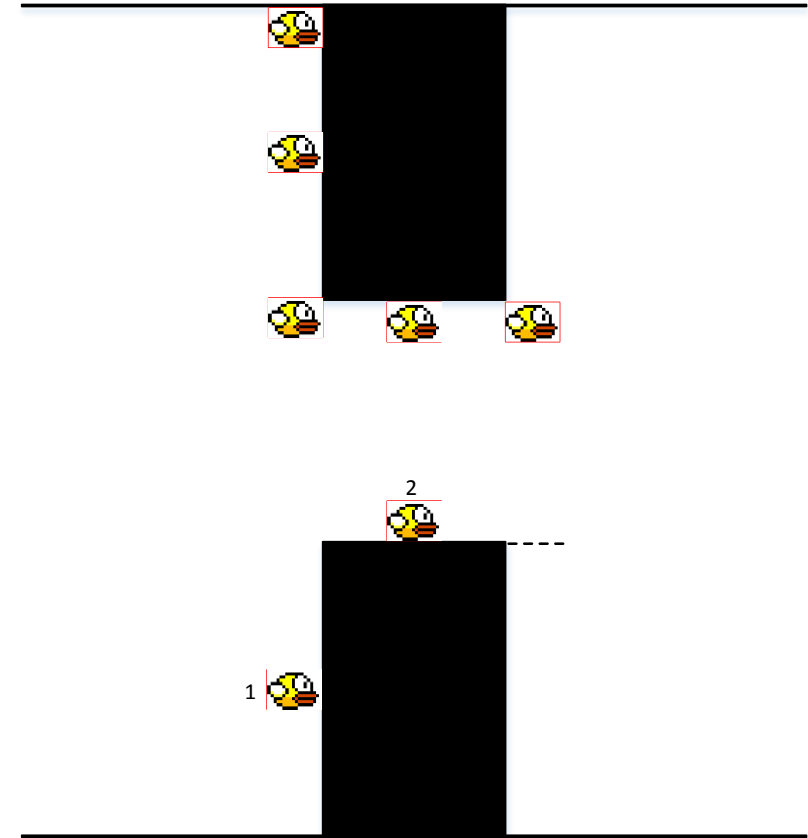
Conception - Score



```
if (Flappy_x+1 == Pipe_x) score++;
```

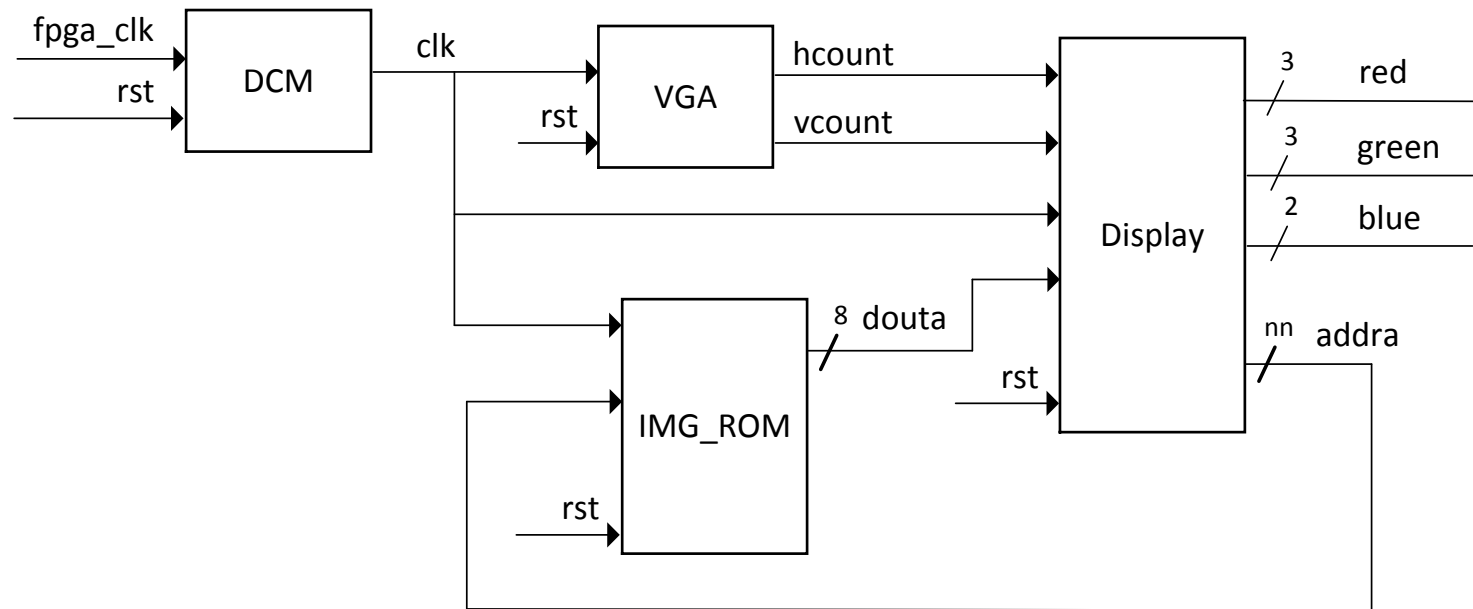
Conception - Crashing test

- Tests
 - Contact avec le sol
 - Contact avec un tuyau (4)



Réalisation

- Démarche
- Affichage des images
 - Constantes
 - Block ROM



Tests

- Simulation avec macros
 - Synchronisation des boutons
 - Position du Flappy
 - Position des tuyaux
- Cas de tests

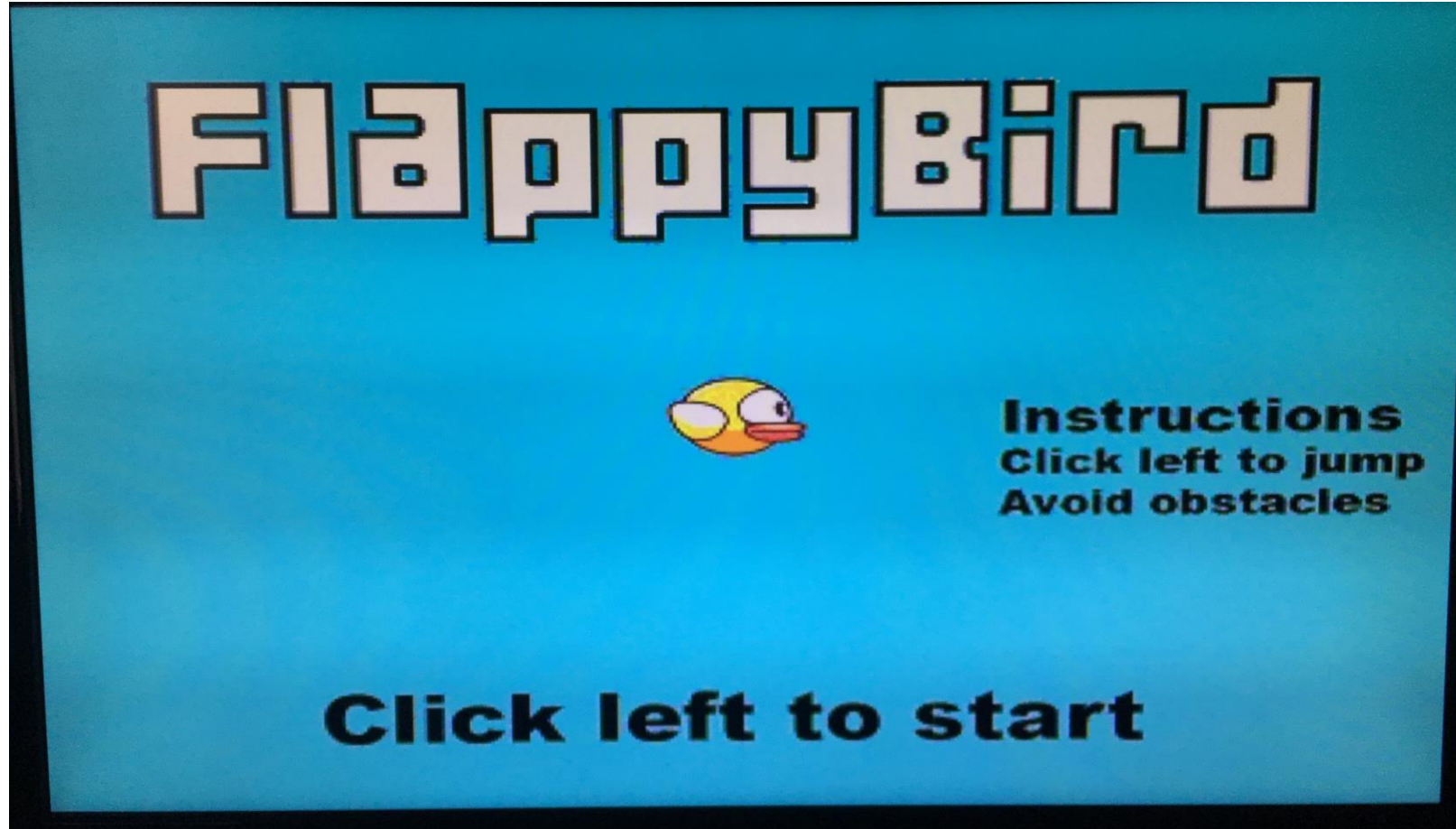
Etape du jeu	N°	Objectif, Description, Entrées et Sorties	Résultat
	O		
	D		
	E		
	S		

Conclusion

- Résultat visible et fonctionnel
- Motivant
- FPGA pas « adaptée »



Démo



Questions

