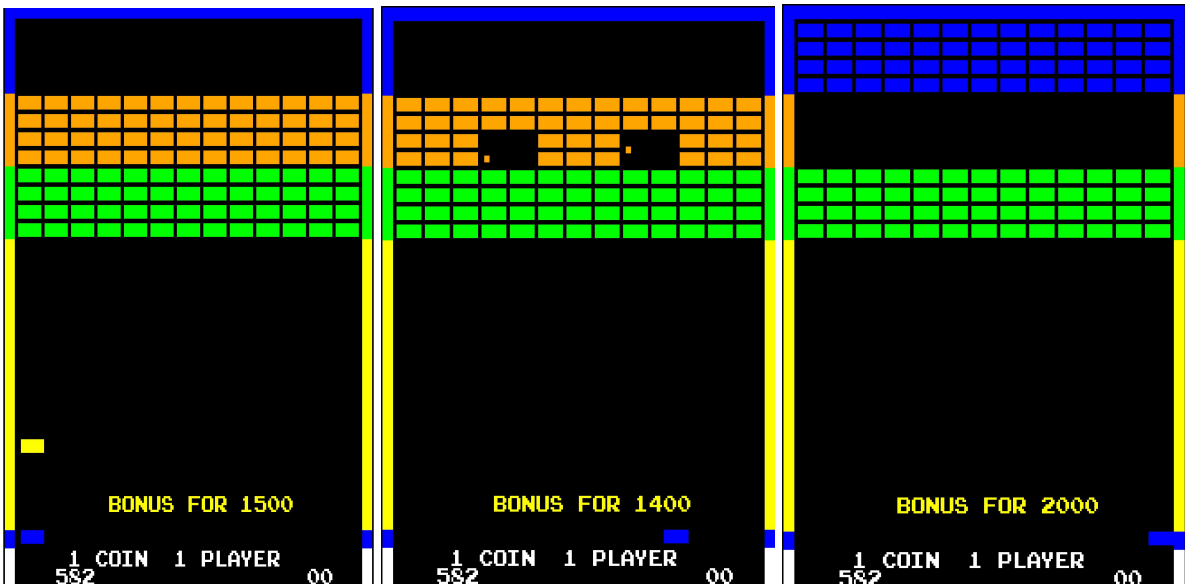
Group: Alen Sugimoto, Francesco Costa, Diell Kryeziu, Laurenz Ebi

Change Log for Fury Breakout 2020

A remake of Super Breakout (1978 Atari)

While the main idea of working on Super Breakout as a base for our project remains, the final objective has become more concrete and defined: we decided to opt for a full on remake of the original Super Breakout (1978 Atari) and not only for the progressive mode with various additions. The change was implemented to have a clearer idea of the final product as well as to implement different modes and have a direct comparison to work with. This means that the base idea of the bricks layout as well as the paddle and ball hasn't changed much, the details of it are what was refined and improved. The game now has 3 playable modes (one of which is the progressive described in our proposal):



1) Double 2) Cavity 3) Progressive

The Double mode features a fixed wall of bricks (8 x 13) and two paddles that move synchronously one above the other. Two balls are served in this mode and the point values of each brick vary depending on its row position and on the number of balls still in play.
The Cavity mode has a similar brick structure to Double, but also presents two "holes" (2 x 3) which contain one ball each. These balls can't destroy blocks until they touch the paddle for the first time. As before the point values of the bricks vary depending on the number of balls in play (from 1 to 3) and the row position of the bricks.
The game can now also be played by two players in a competitive manner (1 versus 1) and the way it is handled is by turns, followed by the comparison of the scores.
The paddle is controlled via the mouse to provide more control on sharp movements, since multiple balls can be hard to manage. The idea of the pause function has been abandoned since it wasn't present in the original arcade game. We now have a starting selecting menu which allows the player to select game and player mode. All special features that weren't in the original game have been dropped (for example the power ups).

Going more in depth most of the type definitions and structures have been changed by adding more arguments necessary to make the program work smoothly.
Here is one example with the ball structure from before and after:

```
; a Velo is (make-velo Number Number)
; interpretation: a velocity vector ('x', 'y') in pixels per clock tick
(define-struct velo [x y])

; a Ball is (make-ball Posn Velo NonnegativeInteger)
; interpretation: a ball, which has hit the paddle
;                 'paddle-hit-count' times, with
;                 position 's' and velocity 'v'
(define-struct ball [s v paddle-hit-count])
```

```
; a Ball is (make-ball cx cy speed dir rico-vobject tick-vobject paddle-hit-count serve-delay has-child?)
;    where cx, cy           : Number
;          speed            : NonnegativeNumber
;          dir              : Angle
;          rico-vobject     : VObject
;          tick-vobject     : VObject
;          paddle-hit-count : NonnegativeInteger
;          serve-delay      : NonnegativeNumber
;          has-child?       : Boolean
; interpretation: a ball, which collided with 'tick-vobject' in the last clock tick
;                 and most recently rebounded off of 'rico-vobject',
;                 with position ('cx', 'cy'), speed 'speed' in pixels per second,
;                 direction 'dir', and a paddle hit count of 'paddle-hit-count'
(define-struct ball [cx cy speed dir rico-vobject tick-vobject paddle-hit-count serve-delay has-child?])

; a VObject is one of the following:
; - a Brick
; - a Paddle
; - a Backwall
; - a Frontwall
; - a Nothing
; interpretation: an object that may rebound a ball vertically
```

The sounds used in our version are taken directly from the original game and are implemented as stated in the proposal, through the Rsound library.

Most of the implementation has been done following the description of each mode stated in the original manual:
https://www.gamesdatabase.org/Media/SYSTEM/Arcade/Manual/formated/Super_Breakout_-_1978_-_Atari.pdf