Three Astro-Arcades developed with SCRATCH to play with astrophysics

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ARCADE-STYLE GAMES FOR AN ASTRONOMY EXHIBITION

- Time Machines: a pop exhibition at Palazzo Esposizioni Roma, in Italy (Nov 2023 - March 2024) celebrating the wonders of the Universe
- Featuring interactive displays and activities to explore the mysteries of space and time, including an actual arcade with 80s-style video games
- Three arcade-style video games were created using Scratch, a block-based visual programming language aimed primarily at children, developed by MIT: Asteronoids, Planetris, and AstroPacman

HOW WE CREATED THE GAMES...

- Based on classic titles like Arkanoid, Tetris, and Pacman
- With an astronomical twist: to learn astronomy while having fun
- Sprites (graphical objects in Scratch) representing astronomical objects were specially designed to match the exhibition's visual identity
- A common framework for all three games:
  - Introduction: instruction, scientific explanation, countdown
  - Play until... GAME OVER
  - At the end: enter your name, score and ranking list

... AND HOW TO PLAY

- Anyone can play for free on any computer via the website play.inaf.it
- ... and also look at the underlying code blocks and use them in the classroom to practice computational skills
- At the exhibition: executable file running on a mini-pc with a monitor, installed in an original arcade cabinet with a joystick

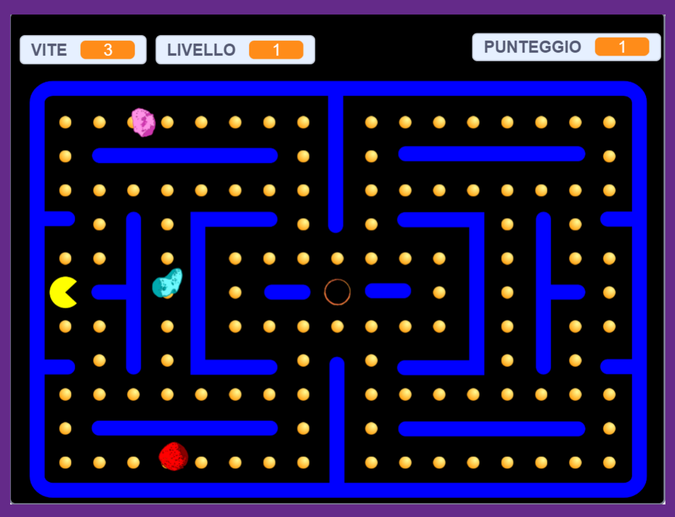
ASTERONOID

Destroy dangerous asteroids, with the help of comets

Description

- Destroy as many asteroids as you can with a bouncing ball
- But watch out: different asteroids require a different number of shots to be destroyed, depending on their composition:
  - 1 shot for type C asteroids (with high carbon content)
  - 2 shots for type S asteroids (mainly made of silicates)
  - 3 shots for type M asteroids (which contain metals)
- Comets appear randomly: if you hit a comet, you win an extra ball

ASTROPACMAN

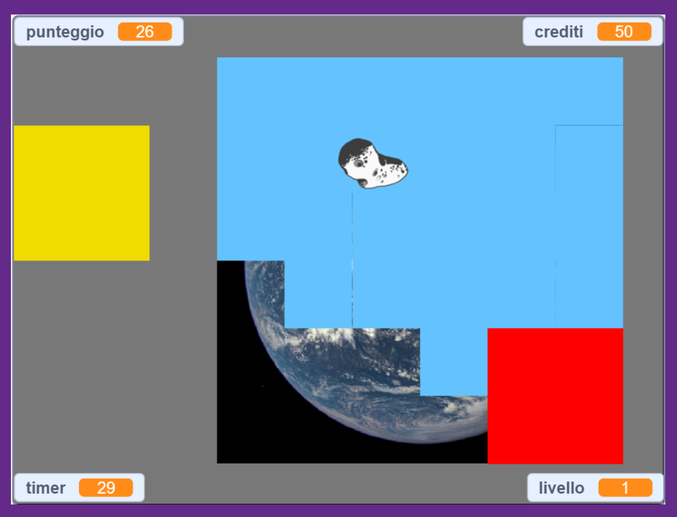


Guide pacman among stars, avoiding dangerous objects

Description

- Have fun guiding Pacman among the stars of the Milky Way
- Watch out for asteroids passing by
- Pay attention to the black hole at the center: if you pass too close to its event horizon, you will not be able to escape
- Stellar explosions and supernova remnants appear randomly: catch them and the black hole turns for a few seconds into a wormhole, taking you to another part of the galaxy and granting an extra life

PLANETRIS



Compose the puzzle and discover a planet

Description

- Aim: to (literally) "unveil" different objects within the Solar system
- Arrange the different tiles correctly: each tile will then reveal a portion of the planet (or Sun / Moon)
- Need to act quickly: a countdown starts each time
- Caution: need to avoid asteroids passing by!
- Once the mosaic is fully unveiled, you can read a brief note about that celestial object

PRACTICE COMPUTATIONAL THINKING WHILE PLAYING

- One of Scratch's unique features: it allows users to examine the programming algorithms, discover tips and tricks, and even remix the code for their projects
- An excellent educational tool for budding programmers and game designers
- We hope players enjoy these games, find them informative and engaging, and be inspired to learn more about astronomy and space exploration