Digital Circuit Lab
Final Project

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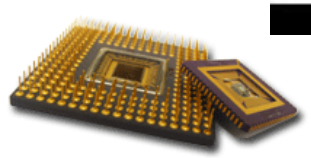
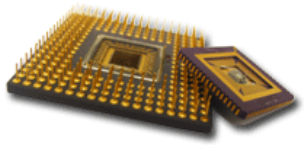
Snake (貪食蛇) Design



Basic Function Requirements

- Draw the snake with 5 length units, where the snake can move
- The snake can bend.
- Provide the food indicated by a circle and generate some obstacles
- Snake can eat the food without changing the body length.
- The game scene has the boundary.
- Use button or switch to control the interaction

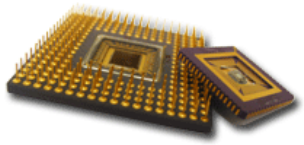
PS: All items have to use VGA display.



Advanced Function Requirements

- Design a scoring system
- Design a variable snake length
- Design if the snake hits the obstacle, the scoring will be decreased. While the scoring is zero, game over
- Design different scenes

PS: All items have to use VGA display.



Tetris (俄羅斯方塊) Design

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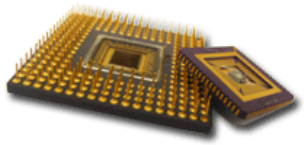
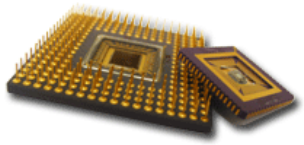


Basic Function Requirements

- Draw the tetris game background
- Provide 7 different shape/configuration units
- The row in tetris can be disappeared while this row is full.
- The unit can be rotated.
- The game scene has the boundary.
- Use button or switch to control the interaction

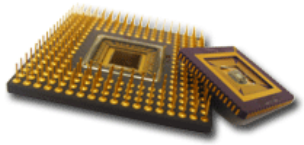
PS: All items have to use VGA display.



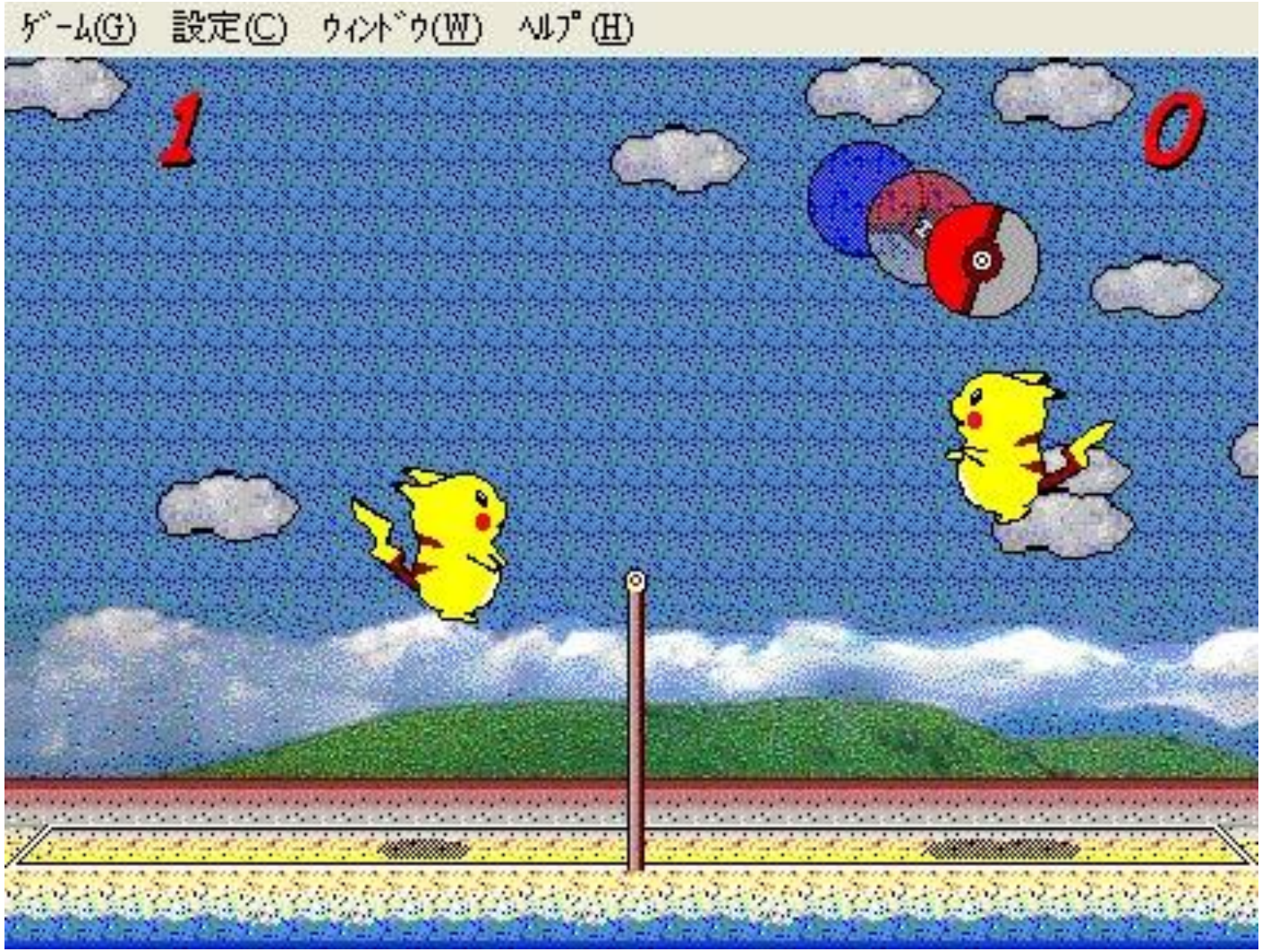
Advanced Function Requirements

- Design a scoring system
- T rotate
- Change the unit
- Randomly generate obstacles

PS: All items have to use VGA display.



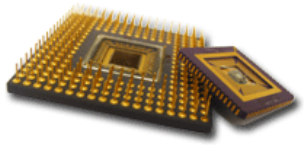
Pikachu Volleyball (皮卡丘打排球) Design



Basic Function Requirements

- Draw one Pikachu
  - This Pikachu can move on the ground.
- Draw another Pickchu (default player)
  - The default player can move by himself.
- Draw one ball and a net
- The player and ball cannot go through the net.
- If the ball hits the boundary, player, and net, the ball will be returned in straight line.
- The game scene has the boundary.
- Use button or switch to control the interaction

PS: All items have to use VGA display.



Advanced Function Requirements

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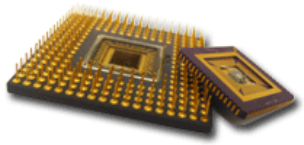
- Design a scoring system
- While the ball hits the player, the ball will be returned in parabolic way.
- Design the player can jump
- Design the player can smash with faster ball speed

PS: All items have to use VGA display.



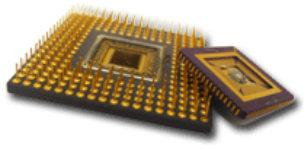
Vending Machine (自動販賣機) Design

http://www.alona.com.tw/index_tw.php

Basic Function Requirements

- Draw the vending machine infrastructure and bottles of water, juice, and tea with specified prices.
- Virtually design the coin slot (like window) for 10 and 100 NTD by controlling button or switch
- Show the selected bottle can be picked up (move the specific location)
- Show the money you insert
- The design scene has the boundary.
- Use button or switch to control the interaction

PS: All items have to use VGA display.

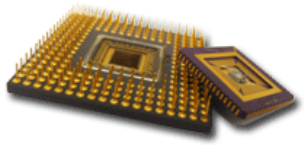


Advanced Function Requirements

Final Project

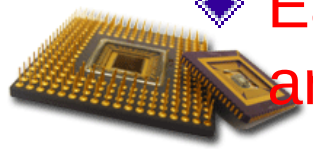
- Design a counting system
- Show the returned change
- Consider the multiple product selections
- Consider the limited product resources
- Consider the limited money that machine has
- Consider more different NTD types

PS: All items have to use VGA display.



Grading Policy

- The final project occupies 30% of the overall grade. That means this final project has 30 points in this course.
- The basic function requirements occupies 60%. That means 18 points.
- The advanced function requirements occupies 40%. That means 12 points.
- The extra functions occupies 20%. That means 6 points.
  - User interface
  - User experience
  - Additional novel function
- Each team presents the final project demo in English and gets extra 5 points.



Final Project Regulations

- The final project is team work. Each team has 4 people at most.
- Dec. 19, 2025 (Fri.) is the final project demo. (Please submit your final version to our system as requested by TAs.)
- No make-up demo.
- Each team provides the report including each member's contribution number on Dec. 20 (Sat.), 2025 and delivers to 孫世諭: (sunshihyu.owo@gmail.com)。 (The report template can be downloaded from E3.)
- We will NOT provide any materials, documents or codes for the final project.
- No copy and no plagiarism across the teams. If detected, the scores of the final project of the related teams will be zero.