Digital Circuit Lab
Final Project

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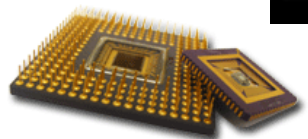
Fall, 2024

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http://www.cs.nctu.edu.tw/~ldvan/

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
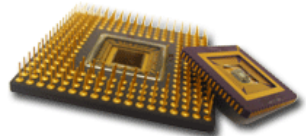
PS: All items have to use VGA display.
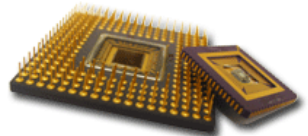
Advanced Function Requirements

- ◆ 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
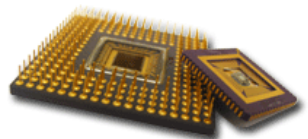- ◆ Design different scenes

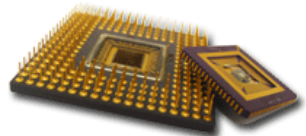PS: All items have to use VGA display.

Tetris (俄羅斯方塊) Design

DCL-FP-5

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
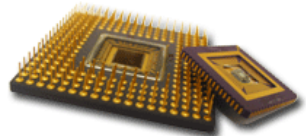
PS: All items have to use VGA display.

Advanced Function Requirements

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

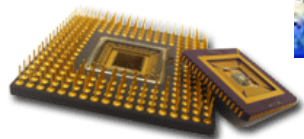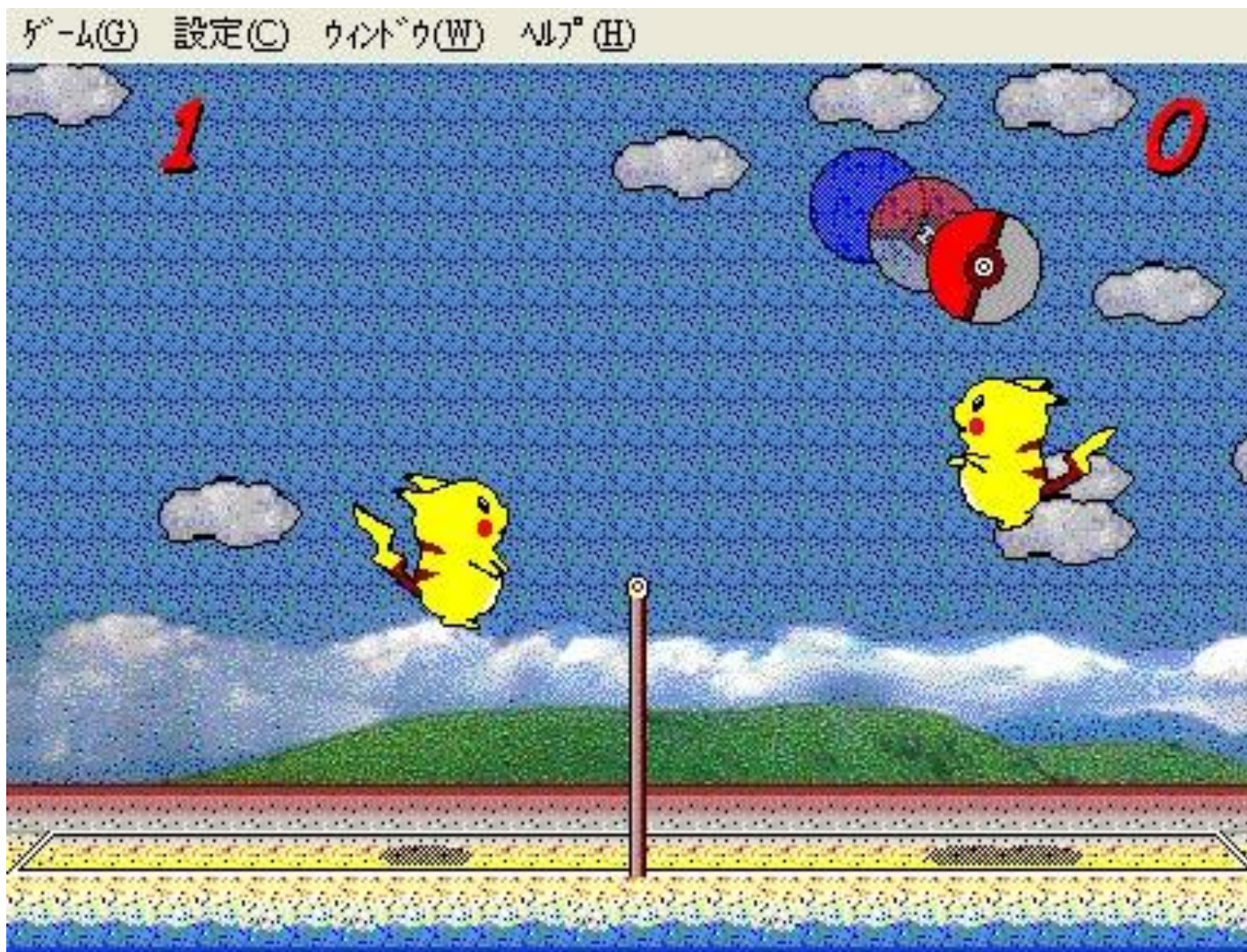PS: All items have to use VGA display.

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.
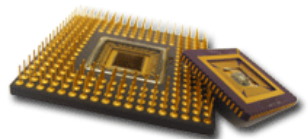
Advanced Function Requirements

◈ Design a scoring system

◈ While the ball hits the player, the ball will be returned in parabolic way.

◈ Design the player can jump
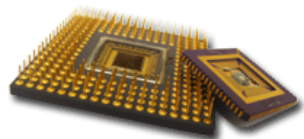
◈ Design the player can smash with faster ball speed

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 bottle you select 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

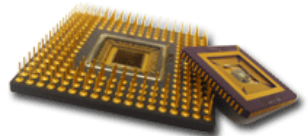PS: All items have to use VGA display.
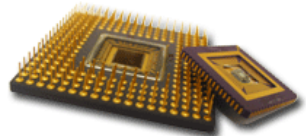
Advanced Function Requirements

- 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
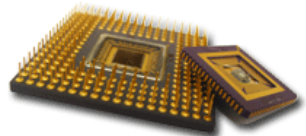
Final Project Regulations

- ◈ The final project is team work. Each team has 4 people at most.

- ◈ Dec. 20, 2024 (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. 21 (Sat.), 2024 and delivers to 鄭鈞瀚助教 (bensonabc1107@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.