The American University in Cairo

CS 110 Project

Pac-Man Game

Decoders Group

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https://engineering.purdue.edu/OOSD/F2009/Assignments/IPA/pacman.html

http://scratched.gse.harvard.edu/sites/default/files/pacman_lesson.pdf

http://pacmancode.com/code.html

❖General Requirements<mark>"All of these are well explained in classes and pseudo code"</mark>

➢ Menu : to start game , exit game, register, sign in, sound on/off, instructions for game,shop, highscores . Another menu when the game is paused for exiting the game or sound on/off. Menu after losing to restart or quit and showing the player's final score

➢ 3 levels : difficulty depends on the maze graphing ,time limit, speed of ghosts, more pickups to offer

➢ 3 lives for the user : decreases when pacman is hit by ghosts , game is over when they are all used up, pickups for more lives can be offered in more difficult levels

➢ Pac dots: small ones that increase the score when eaten , large one gives pacman immunity for 5 secs (won't die if it got hit by a ghost during this time)

➢ Time limit for each level : if the time is over , the player loses

➢ Fire pickup to remove the ghosts out of the path of pacman (offered in difficult levels)

❖Pseudocode

➢ Player opens the window of the game

➢ The start menu is displayed

➢ A new user file is created or an old user file is opened

➢ New game is started

➢ The maze for the specified level is displayed

➢ All the ghosts are in their house

➢ Pac-man at the start of the maze

➢ The game then starts

➢ The stopwatch is started

➢ The ghosts move randomly according to their modes

➢ Pac-man moves anywhere around the map using the keyboard arrows and it is prohibited to get in the ghosts' house.

➢ The ghosts and Pac-man need to avoid hitting the walls and stay between the walls.
➢ The speed of the ghosts/pac-man is set according to the level difficulty
  ■ The equation that is used to set the distance and velocity of the ghosts and pac-man is: $s(t) = s_0 + v\Delta t$
➢ The pacdot disappears when it is eaten
➢ If a large pac-dot is eaten , pac-man gets immune, and ghose enter the Freight mode.
➢ If pac- man was immune and ate a ghost, the ghost become trapped in its house(Spawn mode).
➢ The score is incremented when the packdot is eaten
➢ The score is incremented when the bonus fruits are eaten
➢ Change in the speed of the ghosts according to the time/pac-dots left
➢ If pac-man gets eaten by ghost; lives will be decreased
➢ If the number of lives become zero, a menu appears to the player (Play again - quit the game)
➢ If no pac-dots are left, the player moves to the next level.

❖Classes and their Functions
➢ *Menu:*
  ■ New Game: starts new game with a new userfile
  ■ Add User: creates a new file for this user saving all his information
  ■ Clear User: deletes the file of the specified user
  ■ Highscores: shows the first 3 highscores for one user or the highscores for multiple users if implemented
  ■ Clear Highscores: deletes all the highscores and clears the list
  ■ Exit Game: it allows the user to quit the game while playing
  ■ Shows Instructions: a message showing the basic instructions for playing and introducing the characters and pickups (if implemented)
  ■ Sound on/off: allow the user to play having background sounds or the user can mute these sounds

- **Shop (if implemented):** takes the user for shopping for variety of better quality pickups that are only unlocked with certain scores

➢ *Maze:*

- Graphing the maze according to the level reached (done: class)

(I drawed the ghosts house by modifying the map)

➢ *Pacman:*

- Gender: allows the user to choose the shape of pac-man according to the specified gender
- Colour: allows the user to choose the colour of the pac-man
- Speed: Changes the speed as it progresses in levels

➢ *Pac-dots:*

- Small sized pac-dots:
  - Set only in the path of the pac-man (done: class)
  - The Score increases when they are eaten
    (cyan color means related to class player)
- Large sized pac-dots:
  - Set randomly in the path of the pac-man (not large in number) (done: according to map)
  - The Score increases when they are eaten
  - Pac-man get immune when they are eaten for 5 secs
  - Ghosts can be eaten during the 5 secs, incrementing the score when eaten
- Increment/Decrement score:
  - Setting a counter
    - ◆ It is incremented when:
      - ➢ Small pac-dots are eaten
      - ➢ Large pac-dots are eaten
      - ➢ Ghosts are eaten/ fired at
      - ➢ Score booster is eaten (if implemented)
    - ◆ It is decremented when:
      - ➢ Score inhibitor is eaten (if implemented)

➢ *Ghosts:*
- Setting a home for the ghosts <mark>(done:drawn by the map)</mark>
  - <mark>Pac-man cannot access this home</mark>
  - At the start of the game, the ghosts are all in this area.
  - They also get in when they are eaten by Pac man
- Speed of the ghosts: to be determined by the user.
- Direction variable based on random numbers: determine the direction of each ghost in the game
  - move it accordingly.
  - Checking if the edges are touched.
- Modes of the ghosts: Chase, or Freight mode
  - Chase mode: is implemented all the time during the game unless Pac-man eats a power dot.
  - Scatter mode: the ghosts take a specific corner in the grid on which they remain still for 7 seconds.
  - Fright mode: associated with a timer, is implemented to all ghosts when Pac-man gets immune by the Pac-dots.
  - Spawn mode: is implemented if the ghost was in the fright mode and eaten by pac man

➢ *Player:*
- Name
- Password
- Score: the score of each player is incremented based on the dots it eats.
- Pac-man extra lives
  - Extra life every 5,000 points
  - Distributed randomly in the map
  - Pac man can have 5 lives max.

➢ *Pickups:*
- Bonus fruits(Twice per level):

- ● After 70 dots eaten, a bonus fruit appears (Disappear after 10 seconds)
  - ● The second appears after 170 dots (Disappear after 10 seconds).
- ■ Firing: Depends on the score of the player
- ■ Extra Time
- ■ Extra Lives
- ■ Speed inhibitor/ booster
- ■ Freezing time/ ghosts

➢ *Messages:*
- ■ Won: displaying it when the user wins (eats all dots within time limit)
- ■ Time left to finish the game: displaying a stopwatch
- ■ Lives Left : displaying lives
- ■ Score: displaying the score counter
- ■ Game over: displaying it when the user loses (time/lives is/are over)
- ■ Play again: displaying it when game is over
- ■ Quit the game: displaying it in the pause menu while playing