# Pentominos

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# General

## Game Type

A classic Greek puzzle game updated for the modern age.

Similar To:

Jigsaw puzzles, Tetris.

## Players

- Pentominos is a single player game ONLY on smart phones and the web
- Tablets (iPad, Android tablets) have a mode called Battle Pentos, which is for two players on a single device.

## Modes

**Pento Tower:** Solve the classic Pentomino rectangle puzzle, using only the 12 Pento pieces; then solve it again and again, using a different solution each time. Players may not use the same piece twice.

**Pento Puzzle:** Solve a puzzle which is a fun shape (provided by the game) using only the 12 Pento pieces.

**Battle Pentos:** [tablets only]: The screen is split in half, and two players compete to solve the classic Pento puzzle the fastest.
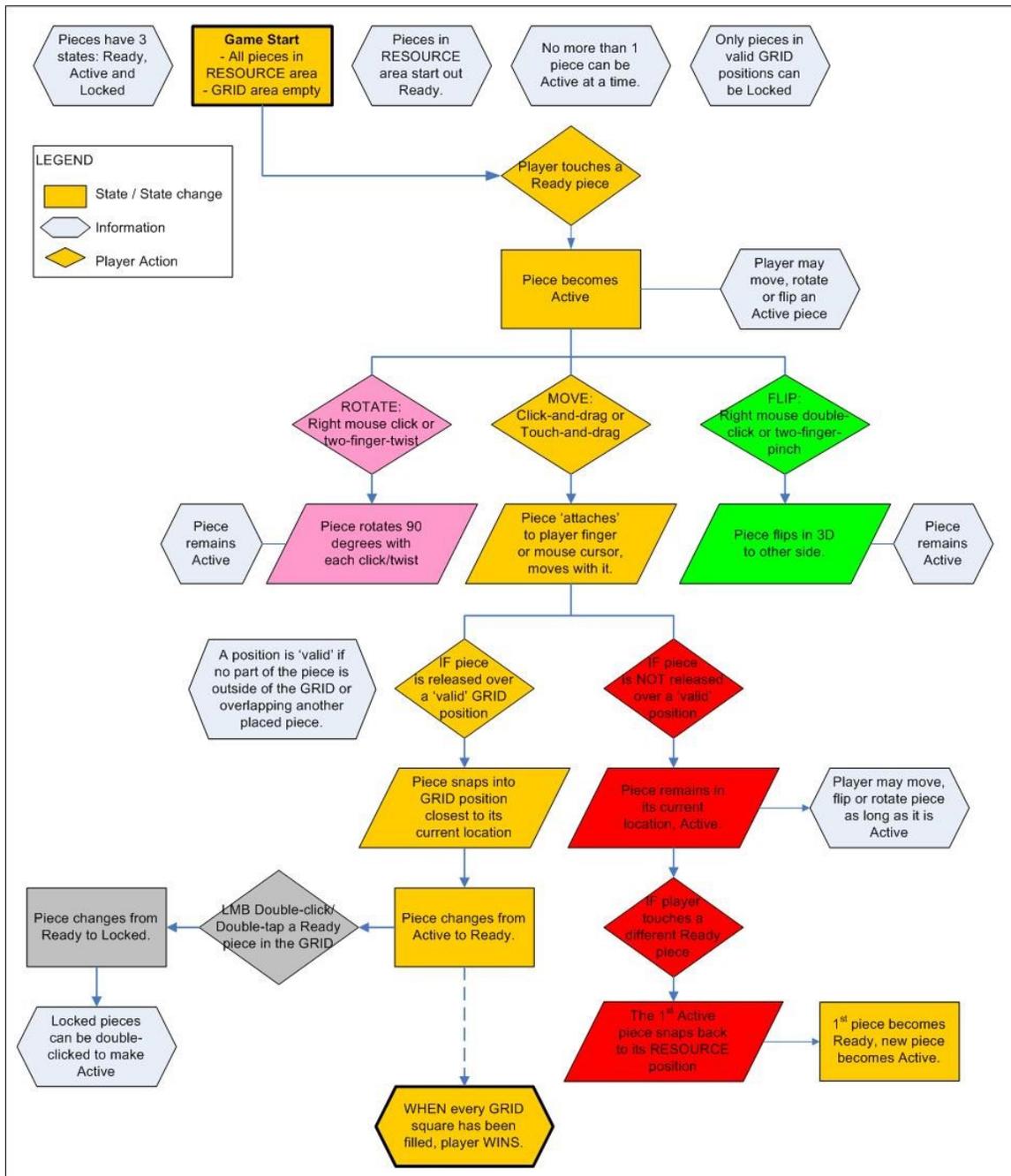
**Tutorial:** A comprehensive tutorial that teaches players all of the controls and options of the Pentominos app, as well as offering some strategy advice.

## Objective

The objective of the game is to fit the 12 different Pento pieces within the space provided by the game. In Pento Tower and Battle Pentos modes, the space is a simple rectangle. In Pento Puzzle, the space can be any shape our level designer dreams up. In both cases, a grid will be visible on screen, showing where pieces can legally be placed.

## Core Game Loop

The main thing the player will be doing, regardless of game mode, is dragging a pento piece from the *resource* area of the screen onto the *grid* area of the screen. The player will need to *rotate* the piece, and occasionally *flip* it (think 'reflect' in Photoshop). See flowchart on page 3.

Pieces have 3 states: Ready, Active and Locked

**Game Start**
- All pieces in RESOURCE area
- GRID area empty

Pieces in RESOURCE area start out Ready.

No more than 1 piece can be Active at a time.

Only pieces in valid GRID positions can be Locked

LEGEND
- State / State change
- Information
- Player Action

Player touches a Ready piece

Piece becomes Active

Player may move, rotate or flip an Active piece

ROTATE:
Right mouse click or two-finger-twist

MOVE:
Click-and-drag or Touch-and-drag

FLIP:
Right mouse double-click or two-finger-pinch

Piece remains Active

Piece rotates 90 degrees with each click/twist

Piece 'attaches' to player finger or mouse cursor, moves with it.

Piece flips in 3D to other side.

Piece remains Active

A position is 'valid' if no part of the piece is outside of the GRID or overlapping another placed piece.

IF piece is released over a 'valid' GRID position

IF piece is NOT released over a 'valid' position

Piece snaps into GRID position closest to its current location

Piece remains in its current location, Active.

Player may move, flip or rotate piece as long as it is Active

Piece changes from Ready to Locked.

LMB Double-click/ Double-tap a Ready piece in the GRID

Piece changes from Active to Ready.

IF player touches a different Ready piece

Locked pieces can be double-clicked to make Active

The 1st Active piece snaps back to its RESOURCE position

1st piece becomes Ready, new piece becomes Active.

WHEN every GRID square has been filled, player WINS.

## Controls

There will be one set of controls for the mobile/tablet versions, and different controls for the online version. I will list both sets:

- **Select a piece:** Touch or left-mouse click a piece once.
  - Piece changes from Ready to Active
  - Active pieces can be moved, rotated, or flipped.
- **Move a piece:** Touch-and-drag or click-and-drag an Active piece.
  - If the piece is over a valid *grid* position when released, it will snap into place on the *grid*. Piece changes from Active to Ready.

- o If the piece in NOT over a valid *grid* position, it will remain in its current position, Active.
- **Rotate a piece:** Use two fingers spread apart and twist in the desired direction OR click the right mouse button.
  - o This can be done with fingers/cursor anywhere on screen; it will only affect the Active piece.
  - o On the mobile versions, the piece will rotate 90 degrees in the direction twisted. On PC, it will rotate 90 degrees clockwise.
- **Flip a piece:** Use two fingers and pinch or spread them OR double-click the right mouse button.
  - o This can be done with fingers/cursor anywhere on screen; it will only affect the Active piece.
- **Access in-game help:** Touch/click the Help button.
- **Quit the game:** Touch/click the Quit button.
- **Sound On/Off:** Touch/click the Sound On/Off button
- **Board Wipe** [tablets & phones only]: If players shake their device up and down, a dialogue box will appear asking them "Do you want to begin again? Yes / No". If users pick 'Yes', all pieces will be returned to *resource*.

## Art Design

- The pento pieces will be simple 3D objects (think big Lego pieces). Each piece will need its own different texture. There are 12 different pieces.
- Each piece can be in 3 different states: Ready, Active or Locked.
- Players should be able to tell at a glance what state a piece is in.
  - o Ready pieces can be in the *resource* or *grid* areas.
  - o Only one piece can be Active at a time. It is the piece the player is currently manipulating. It should look the brightest and most interesting. I suggest a 'shiny' animated texture of some kind.
  - o Only pieces in the *grid* area can be Locked.
- All other art assets will be 2D.
- **Note:** In the phone version and in Battle Pentos, the pieces in the *resource* area will be within a sliding menu of buttons, for space reasons.

## Screen Layout

There are 3 important screen elements within the Pentominos game:
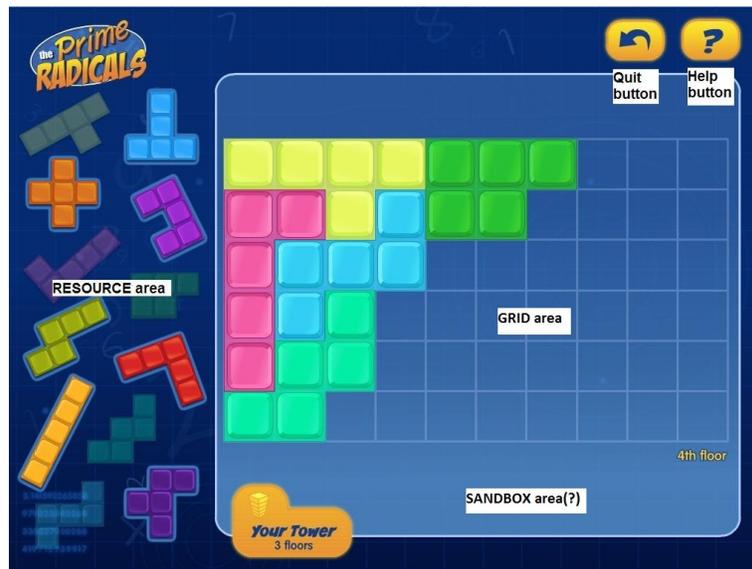1) The *resource* area:
This is where the pento pieces appear at the beginning of the game. The pieces must be far enough from each other that it is hard to click/touch the 'wrong' piece, but not so scattered that they overlap the other areas. The UI should be designed so that it is best for players to hold their device sideways, although if we have time holding it the other way should be feasible. The *resource* area should be on the left and/or right sides of the screen. In Battle Pentos and the phone version of this app, the resource area will be presented as a sliding button menu for space reasons.

2) The *grid* area:

This is where pento pieces are placed to solve the puzzle and win the game. It should always be the centre of the screen. In Pento Puzzle, where it may be hard to determine the *grid*'s centre, placement will be left to the artist.

3) The buttons:
   a. Help: Shows instructions dialogue box.
   b. Quit: Brings up "Quit Yes/No?" dialogue.
   c. Sound On/Off: Turns the app's sounds on or off.
   d. View Tower [Pento Tower mode only]: Allows player to view his tower and browse his previous solutions. Place where convenient.



### From Ready to Active

As you can see in the concept image above, the pieces in the *resource* area are smaller than the pieces in the *grid* area. Here is how the game will overcome this potentially confusing situation:

- When a Ready piece is touched, it immediately grows to full size (whatever that is for the current *grid* shape) and gains the Active texture.
- When an Active piece is moved, its representation will be completely removed from the *resource* area (not translucent as in concept above).
- When a piece is placed in the *grid*, its icon in the *resource* area stays gone (because you can only use each piece once). The placed piece will lose the Active texture and re-gain the Ready texture.
- **Note:** In the phone version and Battle Pentos, the pieces in the *resource* area will be within a sliding menu of buttons, for space reasons.

# Use Case

This section will detail how the user will use the app, from start to finish.

1) User clicks the Pentominos icon on his mobile device, or loads the web page on PC.
2) User will see a Pentominos splash screen, which will stay up while the assets are loading.
3) User will see the Main Menu screen. The options in the MM are:
    a. Pento Tower
    b. Pento Puzzles
    c. Battle Pentos [tablets only]
    d. Tutorial
    e. Hints [slider, goes from 0 to 4, pre-set at 4 first time running app]
    f. Quit [mobile & tablet only]

On the Main Menu, the user clicks Pento Tower.
4) Loading Screen? – We may need to have a loading screen here.
5) <u>Pento Tower</u> game
    a. **First Time:** If it is the player's first time using this mode, all pieces will be in the *resource* area and the *grid* will be empty.
    b. **Game:** The player plays the game until he solves the puzzle.
    c. **Help:** If the player clicks the Help button, browse-able instructions will appear, which may or may not be the same as the Tutorial text.
    d. **Tower reward screen:** When the player solves the puzzle, they will be shown a slowly rotating view of their 'Tower'.
    e. **Game:** The player will be told that his new challenge is to solve the puzzle again, but differently. See how many floors you can build!
    f. **Game:** The player will be able to see his last solution, very faintly, in the *grid* area. The pieces from that solution are not selectable.
    g. **Game:** On subsequent plays, one piece will automatically be pre-placed in a location and orientation that will prevent the player from re-using one of his solutions.
    h. If the player tries to use the same solution anyway, he will be told "You already used that one for Floor [X]! Try something different".
    i. **Quitting:** If the player quits, he will see a dialogue: "Are you sure you want to quit? Your current progress will be saved. Yes / No".
    j. **Quitting:** The current state of the game will be saved (# of floors completed and the solution for each).
    k. **Quit:** The app returns to the Main Menu screen.

Back on the MM screen, the user clicks Pento Puzzles.
6) Loading screen?
7) <u>Pento Puzzles</u> game
    a. **Puzzle choice screen:** Player will see a screen where he may choose which puzzle he will solve. Any previously solved puzzles will be indicated with a check mark. The player can also have the app choose a random puzzle, using a "Random" button.
    b. **Game:** Player will begin the chosen puzzle from scratch, whether or not they solved it before.

c. **Reward screen:** When the player solves a puzzle, they are shown a Reward screen. They will then be returned to the puzzle choice screen. The fact that the puzzle has been solved will be saved.

d. **Quitting [game]:** When the player quits, he will be given the choice of returning to the puzzle choice screen or the Main Menu. The current placement of the pieces in the current puzzle will be saved.

e. **Quitting [choice screen]:** The app returns to the Main Menu.

The player returns to the MM screen, and clicks Battle Pentos.

8) Loading screen?
9) <u>Battle Pentos</u> game

   a. **Round choice screen:** Players can choose the number of rounds they want to play: 1, best of 3, best of 5.

   b. **Countdown:** Players will see a text box over the game area. They will be able to see the locations of the pieces and grids. The text is a 5-second countdown and the words "Ready… Go!"

   c. **Game:** Both players compete to solve a puzzle the fastest.

   d. **Reward screen/text:** When one player wins, the round ends, and they see an announcement of the winner.

   e. **Countdown:** If the players chose to play multiple rounds, a new countdown box will appear, saying "Round [X]. Ready… Go!"

   f. Players are not allowed to use the same solution twice in a row. They will see their previous solution, very lightly, in the *grid* area.

   g. **Reward screen:** When one player has won the required number of rounds, they will see a reward screen that says who won.

   h. **Auto Quit:** When the players have dismissed the reward screen, the app will return to the Main Menu.

   i. **Quitting:** If the players choose to quit early, they will see a "Quit? Yes / No" dialogue. Pieces cannot be moved until it's dismissed.

   j. No information is saved in Battle Pentos mode. [Win records? TBD]

On the MM screen, the user clicks Tutorial.

The Tutorial will take players through the objectives and controls of Pentominos step by step. In our best case scenario, these instructions will be read aloud by a cast member of the Prime Radicals show. Players must click or tap a 'next' button to see & hear the next set of instructions on each screen. There will be a 'Quit' or 'Exit' button which will take them back to the Main Menu at any time.

10) Tutorial:

   a. Objective of Pentominos (use each piece once to solve puzzles)

   b. Selecting & moving a piece

   c. Rotating a piece

   d. Flipping a piece

   e. Placing a piece

   f. Your tower [shows Tower reward screen]

   g. Choosing & solving Puzzles [shows puzzle choice screen]

   h. Battle Pentos explanation [tablets only, shows Battle Pentos]

<u>Special: Hint Slider</u>

The hint slider will pre-place 0 to 4 pento pieces in Pento Tower and Pento Puzzle mode. When the player first runs the Pentomino app, the slider will be pre-set at 4 (the maximum). The slider will automatically go down each time the player solves 3 Pento Tower 'levels' or 2 Pento Puzzle puzzles. Players can adjust the slider up or down any time they are on the Main Menu.

On the Main Menu, the player chooses to Quit.

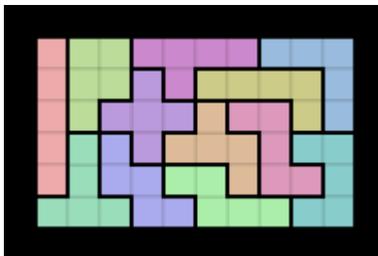    11) **Quitting:** The app is quit and returns to the OS interface.

# Pentomino Pieces and Modes

## The 12 Pento Pieces
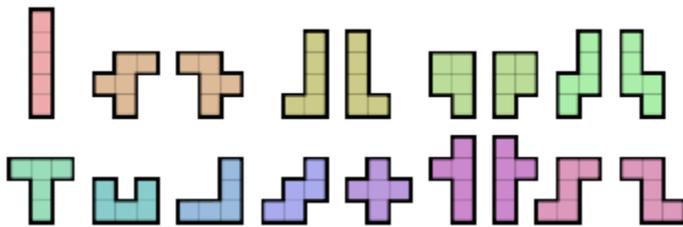


Above is an image of the 12 Pentomino pieces, and their 3D flipped version [only 6 of the 12 have a 3D flip that is different from their regular orientation].

## Solutions



In Pento Tower and Battle Pentos, we will be using a *grid* which is 6 squares high and 10 squares long, as shown above. There are 2339 possible solutions to this puzzle, so players will be able to create *really* tall towers!

## Pento Tower

*Difference in this mode: the 'Tower' reward screen.*

Each time the player completes a different solution, they complete a 'floor' of their Tower.

If there is time remaining at the end, we can add some eye candy to this screen.

## Pento Puzzles

*Differences in this mode: unique grid shapes for each puzzle. Puzzle selection screen.*
We will create 20 unique puzzle shapes for this mode, including the 12 or so freely available puzzle shapes. The puzzles will be animals or objects that are easily identifiable by their shapes, such as a fish, a camel, etc. We may or may not want to draw special frames around the grid area of each puzzle which will make it obvious what each shape is supposed to be.

Some puzzles will have a grid square or two which are not meant to be filled with any pento piece. These will be filled with special blocks with a special texture, e.g. an 'eye' block for the fish puzzle. These blocks cannot be selected or moved by the player, and placed pento pieces cannot overlap them.

Puzzle Selection Screen:
As we have 20 puzzles in this mode, we will need a special screen where players can select the puzzle they want to attempt. It will be a simple screen with large buttons, each of which contains a 'preview' of the grid shape. If more than one 'page' of buttons is necessary, we will have a slider for browsing.
- Completed puzzles will have a green check mark over their buttons.
- Some puzzles may be 'locked' until the player completes a certain number of easier puzzles, TBD.
- There will be a 'Random Puzzle' button on the first button page that allows players to jump into a random puzzle.

## Battle Pentos

*Differences in this mode: 2 players share a device and compete to solve their puzzle the fastest. Device will have to ignore normal 3 and 4 finger commands.*
The puzzle to be solved is the same 6 x 10 rectangle from the Pento Tower game, but now the screen is split in half and there is one *grid* per half. Each player will have their own *resource* area.

The round ends when one player has placed all of their pieces into their *grid*. Game continues until the required number of rounds has been won by a single player (1, 2 or 3). The game auto-quits to the Main Menu after a win.

## Tutorial

The Tutorial is accessed from the Main Menu. It is a series of diagrams and text that explain the game in the following steps:
1) Objective of Pentominos (use each piece once to fill all grid spaces)
2) The Controls
3) Mode-specific info
   a. Purpose and use of the Tower screen in Pento Tower
   b. Purpose and use of the puzzle select screen in Pento Puzzles
   c. Objectives and special features of Battle Pentos [tablet only]

4) Explanation of the Hint slider
5) General strategies for solving Pentominos

*Note:* We would like a member of the Prime Radicals cast to read these aloud.

## Other Design Docs

- Pentominos Art Asset List.xls: a checklist of all the art assets.
- Pentominos Sound Asset List.xls: a checklist of all sound assets.