

2009 Tetris® Design Guideline





TABLE OF CONTENTS

1. INTRODUCTION	1
1.1 WHAT IS TETRIS?	1
1.2 WHY TETRIS?	1
1.3 HOW TO PLAY TETRIS	1
1.4 TETRIS TERMINOLOGY	1
2. BASIC GAME FLOWCHART	3
2.1 LEGAL SCREEN	3
2.2 TITLE SCREEN & LOGO	4
2.2.1 LOGO PLACEMENT & SIZE	4
2.3 MAIN MENU	4
2.3.1 SELECT NUMBER OF PLAYERS	5
2.3.2 SELECT GAME VARIATION	5
2.3.3 SELECT STARTING LEVEL	5
2.3.4 HIGH SCORE TABLE	6
2.4 NEW GAME & INTERFACE	6
2.5 OPTIONS	7
2.5.1 NEXT QUEUE	7
2.5.2 HOLD QUEUE	7
2.5.3 GHOST PIECE	7
2.5.4 LOCK DOWN	8
2.5.5 BACKGROUND MUSIC (BGM)	8
2.5.6 SOUND EFFECTS	8
2.6 HELP	8
3. TETRIMINO GENERATION	9
3.1 COLORED TETRIMINOS	9
3.2 MONOCHROME TETRIMINOS	9
3.3 RANDOM GENERATION	9
3.4 STARTING LOCATION & ORIENTATION	9
4. CONTROLS	11
4.1 TABLE OF BASIC CONTROLS	15

TABLE OF CONTENTS

5. TETRIMINO MANIPULATION	16
5.1 MOVEMENT	16
5.2 AUTO-REPEAT	16
5.3 ROTATION	16
5.4 HARD DROP	16
5.5 SOFT DROP	17
5.6 HOLD	17
5.7 EXTENDED PLACEMENT LOCK DOWN	17
5.8 INFINITE PLACEMENT LOCK DOWN	17
5.9 CLASSIC LOCK DOWN	18
6. LEVELS & GOALS	19
6.1 VARIABLE GOAL SYSTEM & LINE CLEARS	19
7. FALL & DROP SPEEDS	20
7.1 DROP SPEEDS	20
8. SCORING	21
8.1 BACK-TO-BACK EXAMPLE	21
9. T-SPINS	22
9.1 RECOGNITION	22
9.1.1 T-SPIN	22
9.1.2 MINI T-SPIN	22
10. GAME OVER CONDITIONS	26
10.1 GAME OVER CONDITION DIAGRAMS	27
11. GAME OVER EVENTS	28
11.1 END REWARDS	28
11.2 HIGH SCORE TABLE	28
12. MAIN TETRIS VARIANTS	29
12.1 MARATHON	29
12.2 SPRINT (ALSO KNOWN AS 40 LINES)	29
12.3 ULTRA	29

TABLE OF CONTENTS

13. VISUAL/SOUND EFFECTS & MUSIC	30
13.1 VISUAL EFFECTS & ANIMATION	30
13.1.1 LINE CLEAR EFFECTS	30
13.1.2 HARD DROP TRAIL	30
13.1.3 LOCK DOWN	30
13.1.4 BACKGROUND GRAPHICS & ANIMATIONS	30
13.1.5 ACTION NOTIFICATIONS	30
13.1.6 PAUSING THE GAME	30
13.2 SOUND EFFECTS	31
13.3 BACKGROUND MUSIC (BGM)	31
APPENDIX A THE TETRIS ENGINE	33
A1.1 TETRIS ENGINE FLOWCHART	33
A1.2 TETRIS PHASES	34
A1.2.1 GENERATION PHASE	34
A1.2.2 FALLING PHASE	34
A1.2.3 LOCK PHASE	34
A1.2.4 PATTERN PHASE	35
A1.2.5 ITERATE PHASE	35
A1.2.6 ANIMATE PHASE	35
A1.2.7 ELIMINATE PHASE	35
A1.2.8 COMPLETION PHASE	35
A1.3 TETRIMINO FACINGS	36
A1.4 SUPER ROTATION SYSTEM	36
A1.4.1 OBJECTIVES	37
A1.4.2 SUPER ROTATION DIAGRAMS	37
APPENDIX B MULTIPLAYER	79
B1.1 INTRODUCTION	79
B1.1.1 WHAT IS TETRIS MULTIPLAYER?	79
B1.1.2 TETRIS MULTIPLAYER TERMINOLOGY	79
B1.2 GAME TYPES	80
B1.2.1 COMPETITIVE TETRIS MULTIPLAYER	80
B1.2.2 COOPERATIVE TETRIS MULTIPLAYER	80
B1.2.3 PRACTICE MODE	81

TABLE OF CONTENTS

B1.3 LINE ATTACK SYSTEM	81
B1.3.1 BROKEN AND SOLID LINES	81
B1.3.2 GAP RANDOMNESS IN BROKEN LINES	81
B1.3.3 RECEIVING QUEUE	81
B1.3.4 COUNTER ATTACKS	81
B1.3.5 TABLE OF LINE ATTACKS	82
B1.3.6 TABLE OF COUNTER ATTACKS	82
B1.4 USER INTERFACE	84
B1.4.1 GAME SCREEN	84
14. TETRIS GLOSSARY	85

1. INTRODUCTION

1.1 WHAT IS TETRIS?

Tetris® is an electronic puzzle game in which a player manipulates falling Tetriminos (shapes made from four connected squares) to neatly pack them into horizontal lines which are then removed from the Matrix to score points.

1.2 WHY TETRIS?

Tetris is one of the most widely played electronic games of all time. Deceptively simple, Tetris has defied all gender and age barriers worldwide and has helped shape the minds of the digital generation. Tetris has infiltrated nearly every computing device that has control buttons and a screen, from personal computers to dedicated game consoles, from Internet-enabled mobile phones to dedicated hand-held game machines, from coin-operated arcade machines to interactive television, from personal digital assistants to in-flight entertainment systems. The game is quite simply, just that good.

1.3 HOW TO PLAY TETRIS

Tetris is a game satisfying one of the most basic human drives, that is, to create order out of chaos. There are seven differently shaped Tetriminos that fall into a rectangular Matrix. As Tetriminos fall, a player may rotate, move, or drop them into their final resting place. If a row or more of cells is completely filled with Blocks, then the line or lines are cleared from the Matrix and points are scored. The more efficiently a player clears lines from the Matrix (for example, in less time or using more simultaneous Line Clears) the better the player's score will be. Bonuses are given for simultaneous Line Clears, special actions called "T-Spins", and achieving Back-to-Back high-point actions.

1.4 TETRIS TERMINOLOGY

For a complete list of terms, refer to the **Tetris Glossary**.

Back-to-Back: *adj.* describes two major bonus actions, such as two Tetrises, performed without a Single, Double, or Triple Line Clear occurring between them.

Block: *n.* a single block locked in a cell in the Matrix. Also known as an existing Block.

Block Out: *n.* the Game Over Condition that occurs when part of a newly-generated Tetrimino is blocked due to an existing Block in the Matrix.

Buffer Zone: *n.* a 10-cell wide x 20-cell high invisible area above the Matrix used to detect Lock Out, Block Out, and Top Out Game Over Conditions.

Line Clear: *n.* when a horizontal row is completely filled with Blocks, it is removed from the Matrix and is called a Line Clear. All pieces above the Line Clear shift down to fill the space. Most Tetris variations award scoring or other bonuses for the number of lines cleared at one time. These are known as "Line Clear Bonuses".

Lock Down: *n.* the point at which a Tetrimino in play can no longer be manipulated by the player. This generally occurs 0.5 seconds after a Tetrimino lands on a Surface.

Lock Out: *n.* the Game Over Condition occurring when a Tetrimino Locks Down completely above the Skyline.

Matrix (may-trix): *n.* the rectangular arrangement of cells creating the active game area, usually 10 columns wide by 20 rows high. Tetriminos fall from the top-middle just above the Skyline (off-screen) to the bottom.

Tetris® Design Guideline

March, 2009

Mino (mee-noh): *n.* a single square-shaped building block of a shape called a Tetrimino. Four Minos arranged into any of their various connected patterns is known as a Tetrimino.

Skyline: *n.* the horizontal line at the top of the Matrix. Tetriminos fall from the middle of the Matrix just above the Skyline.

Tetriminos (tetri-mee-nohs): *n.* geometric Tetris® shape formed by four Minos connected along their sides. A total of seven possible Tetriminos can be made using four Minos, each represented by a unique color.



O-Tetrimino: yellow; a square shape; four blocks in a 2×2 square.

I-Tetrimino: light blue; shaped like a capital I; four blocks in a straight line.

T-Tetrimino: purple; shaped like a capital T; a row of three blocks with one added above the center.

L-Tetrimino: orange; shaped like a capital L; a row of three blocks with one added above the right side.

J-Tetrimino: dark blue; shaped like a capital J; a row of three blocks with one added above the left side.

S-Tetrimino: green; shaped like a capital S; two stacked horizontal dominoes with the top one offset to the right.

Z-Tetrimino: red; shaped like a capital Z; two stacked horizontal dominoes with the top one offset to the left.

Tetris® (tet-ris): *n.* the result of using a vertical I-Tetrimino to clear four lines at the same time, the maximum possible, for a large scoring bonus. The plural form is Tetris (for example, Back-to-Back Tetris).

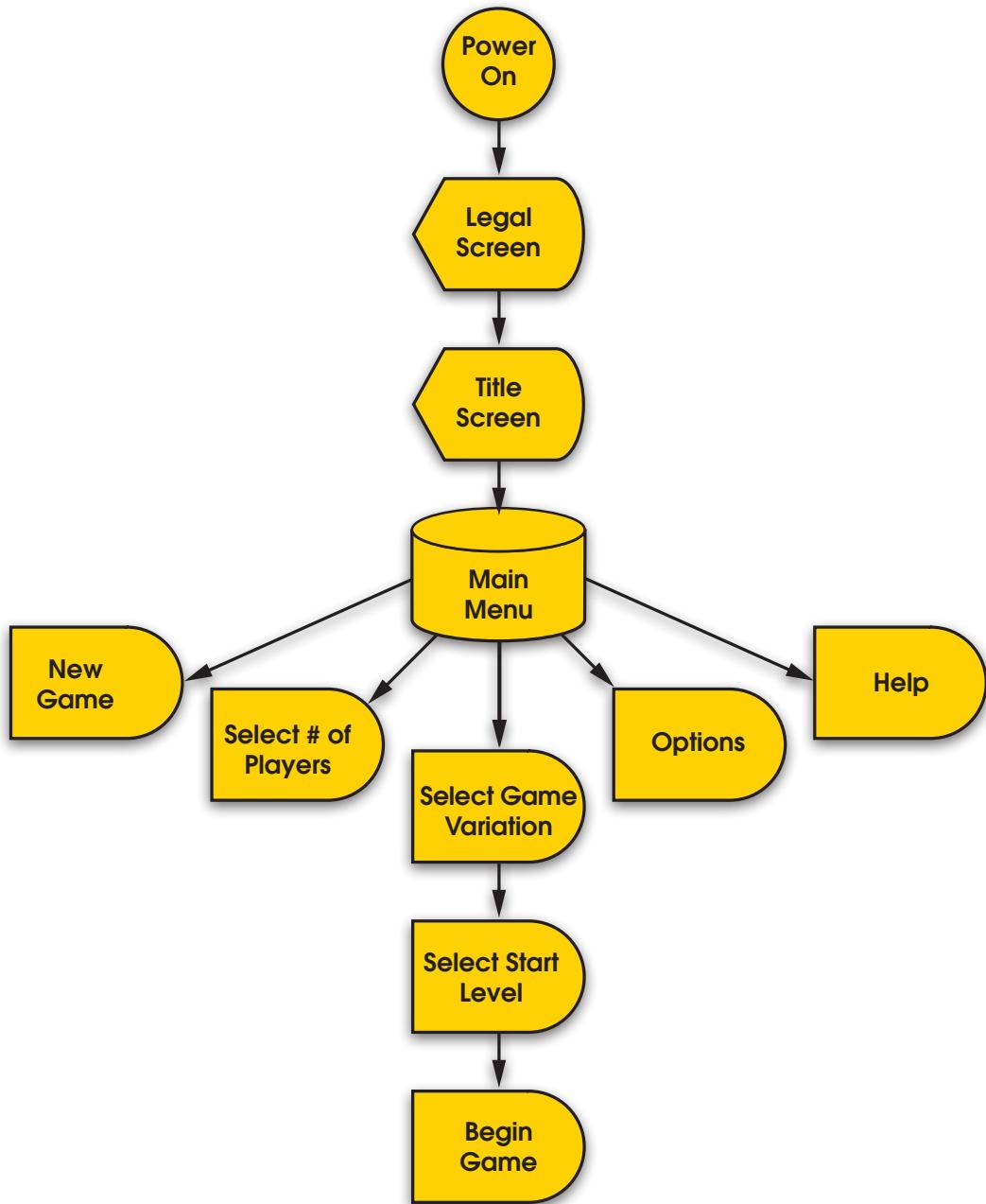
Top Out: *n.* the Game Over Condition occurring when the player receiving New Blocks Lines forces that player's existing Blocks to reach to the top of the Buffer Zone and past the Top Out Line.

Top Out Line: *n.* the ceiling of the Buffer Zone, 20 rows above the Skyline. This is the absolute topmost line in Tetris.

T-Slot: *n.* any Block formation such that when the T-Tetrimino is spun into it, any three of the four cells diagonally adjacent to the center of the T-Tetrimino are occupied by existing Blocks.

T-Spin: *n.* this action can be achieved by first landing a T-Tetrimino, and before it Locks Down, rotating it in a T-Slot.

2. BASIC GAME FLOWCHART



2.1 LEGAL SCREEN

This screen must display the legal notice for the Tetris game. See the **Legal** section in the *Tetris Marketing Guideline* for more information.

Tetris® Design Guideline

March, 2009

2.2 TITLE SCREEN & LOGO

The Tetris logo is comprised of two parts: 1) the "T" and 2) the "Font".

Blue Planet Software provides a color EPS file of the Tetris logo online. The logo can be used only in the approved sizes, proportions, and colors. A ® symbol must be placed next to the top right corner of the logo as illustrated below. In addition, the font must be proportional to the "T" as seen in the image below.



For more information about proper usage of the Tetris logo, refer to the *Tetris Marketing Guideline*.

2.2.1 Logo Placement & Size

Placement: on title, legal, or splash screens, the logo must be centered horizontally on the screen. Vertically, it must be at least as high as the center of the screen, and not be directly touching the top of the screen.

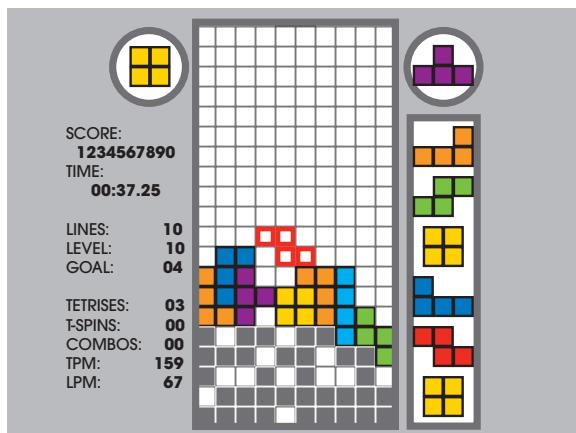
Size: for small screens (non-TV or monitors), especially vertically oriented ones, the width of the logo must take up at least 2/3 of the width of the screen. On 4:3 aspect screens, the width should be at least 1/2 of the width of the screen. On widescreens, it should be at least 1/3 of the width of the screen.

2.3 MAIN MENU

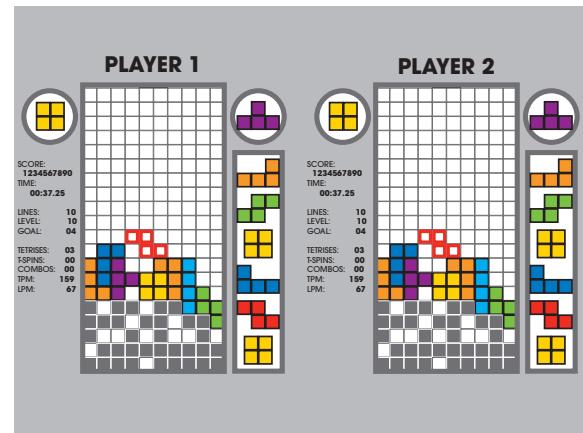
At the Main Menu, the player may select the number of players, the game variation, and the starting level. The player may access the High Score Table and Help. The player may also customize various other settings, such as the basic key configuration and sounds.

2.3.1 Select Number of Players

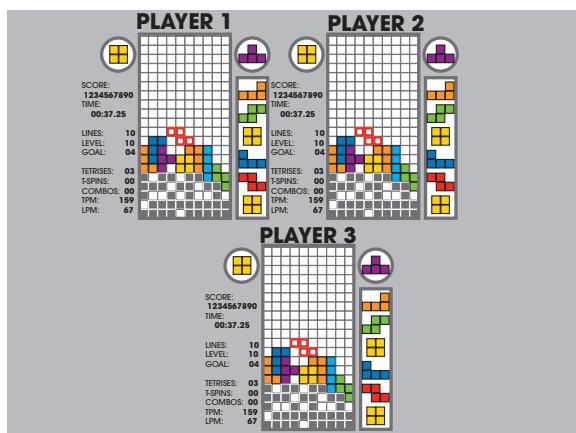
Many Tetris products allow multiplayer game play. The number of supported players corresponds to the size of the common viewing screen. The screen must be able to show a Matrix, Hold Queue, and Next Queue for each player. The basic multiplayer screen layouts are as follows:



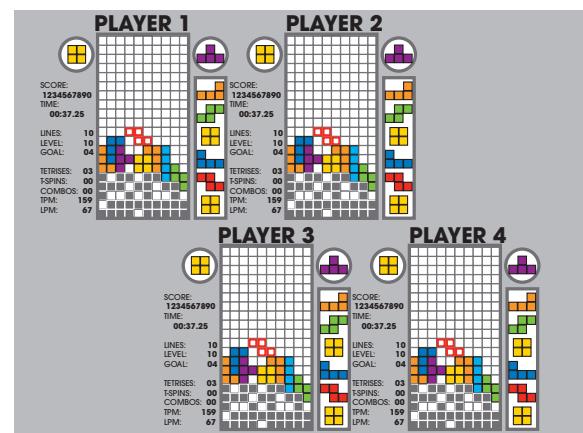
Single Player Screen



Two-Player Screen



Three-Player Screen



Four-Player Screen

2.3.2 Select Game Variation

The default is Marathon Tetris. See the [Main Tetris Variants](#) section for more information.

2.3.3 Select Starting Level

Typically, levels range from 1 to 15. Depending on the Tetris product, the player may have the option of starting at any one of these levels. The default is level 1.

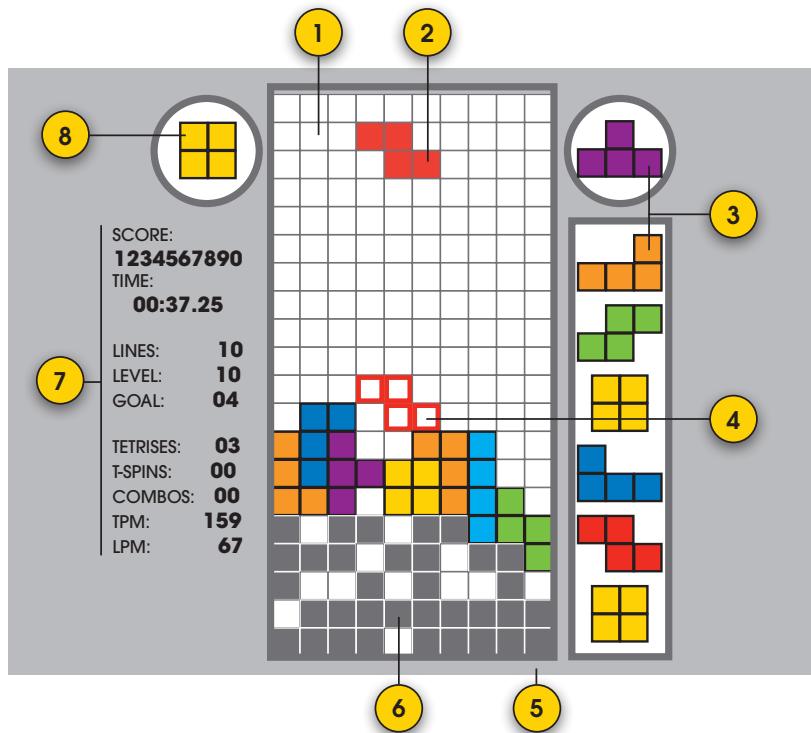
Tetris® Design Guideline

March, 2009

2.3.4 High Score Table

Unless the hardware does not allow it, the player should have access to the High Score Table. See the **Game Over Events** section for information on what is included.

2.4 NEW GAME & INTERFACE



1. The Matrix

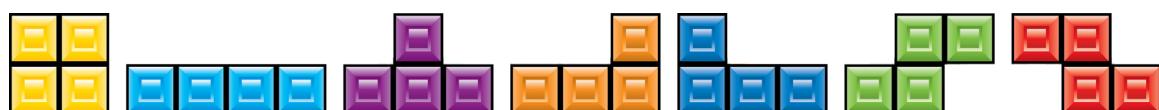
The Matrix is the area where game play occurs. Standard Matrix dimensions are 20 cells high by 10 cells wide.

2. Tetrimino in Play

The player can manipulate this Tetrimino by moving it right or left, rotating it clockwise or counterclockwise, and Hard or Soft Dropping it. Hard Dropping results in the Tetrimino instantly dropping straight down and Locking Down on the first Surface on which it lands. Soft Dropping drops the Tetrimino 20 times faster than the current Fall Speed until the button is released.

3. Next Queue

The Next Queue allows the player to see the Next Tetrimino that will be generated and put into play. It should be located near the top-right of the Matrix. Ideally, the next six Tetriminos should be visible in this queue, but this can vary anywhere from one to six. The queue can be vertical or horizontal, where the Next Tetrimino to enter the Matrix is closest to the top of the Matrix. The Tetriminos must have the following North Facing orientations in the Next Queue:



If animation is provided for Tetriminos in the Next Queue, first priority goes to them being very easy to distinguish in a player's peripheral vision.

4. Ghost Piece

The Ghost Piece is a copy of the Tetrimino in play and indicates to the player where the Tetrimino in play will come to rest if it is "dropped" from its current position. The Ghost Piece can appear as a Tetrimino outline or as a translucent "ghost" image of the Tetrimino. It first appears, always North Facing, at the moment of the generation of the Next Tetrimino.

5. Background Graphic

The Background Graphic is the backdrop on which the screen elements appear. It gives the product character and polish. The background must not visually interfere with game play.

6. Starting Blocks

With several Tetris product variations, the player can vary the number of rows of Starting Blocks that appear at the bottom of the Matrix at the start of a game.

7. Game Information

Information relevant to the game being played is displayed on-screen. Possible fields are:

- Game Type
- Number of Lines Cleared / Number of Lines Left to Clear
- Current Level
- Time Elapsed / Time Remaining
- Current Score
- High Score
- Player Name
- Player Rank

8. Hold Queue

The Hold Queue allows the player to "hold" a falling Tetrimino for as long as they wish. Holding a Tetrimino releases the Tetrimino already in the Hold Queue (if one exists). It is located near the top-left of the Matrix. The Tetriminos are always represented North Facing, just as in the Next Queue.

2.5 OPTIONS

2.5.1 Next Queue

The Next Queue may be customized by setting the number of Tetriminos to appear in the queue. Sometimes this number is dependent on platform, but ranges from one to six.

2.5.2 Hold Queue

The Hold Queue may be turned on or off. The default must be set to on.

2.5.3 Ghost Piece

The Ghost Piece feature may be turned on or off. The default must be set to on.

March, 2009

2.5.4 Lock Down

A Tetrimino that is Hard Dropped Locks Down immediately. However, if a Tetrimino naturally falls or Soft Drops onto a Surface, it is given 0.5 seconds on a Lock Down Timer before it actually Locks Down. Three rulesets—Infinite Placement, Extended, and Classic—dictate the conditions for Lock Down. The default is Extended Placement.

2.5.5 Background Music (BGM)

The background music may be turned on or off. The default must be set to on. The background music volume may be adjusted. The player may also select a soundtrack from a list, or select Random Play which will cycle through the songs between games or levels. For the list of songs, see the **Background Music** section under **Visual/Sound Effects & Music**.

2.5.6 Sound Effects

The sound effects may be turned on or off. The default must be set to on. The sound effect volume may be adjusted.

2.6 HELP

The Help is used to teach the player how to play, the scoring system used, and to display other basic game play topics. Use the correct Tetris terminology in the Help. For example, do not refer to the Matrix as the “Grid” or a Tetrimino as a “Block”. Refer to the **Tetris Glossary** for the correct terminology.

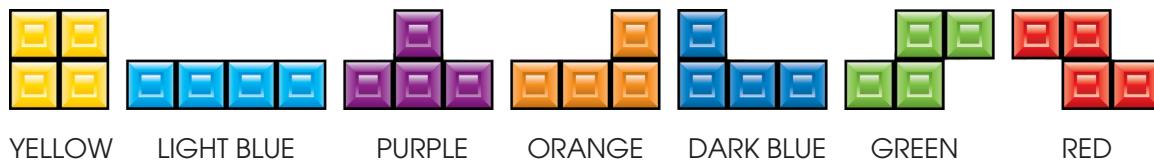
In many games, the Help contains a section for the game credits. See the **In-Game and Game Manual Credits** section in the *Tetris Marketing Guideline* for game credit requirements.

3. TETRIMINO GENERATION

Each Tetrimino is made up of four Minos. The size of a Mino is the same size as a Matrix cell.

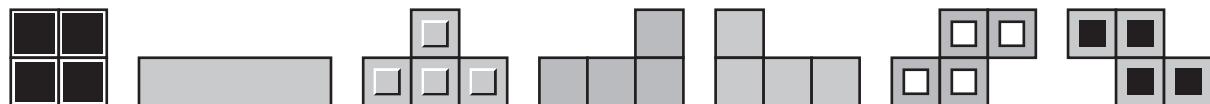
3.1 COLORED TETRIMINOS

The following is the standard color scheme for the seven Tetriminos:



3.2 MONOCHROME TETRIMINOS

In versions that use monochrome screens, or when hardware limitations disallow all colors to be used, the Tetriminos should have distinct hues and patterns to differentiate themselves.



3.3 RANDOM GENERATION

Tetris uses a “bag” system to determine the sequence of Tetriminos that appear during game play. This system allows for equal distribution among the seven Tetriminos.

The seven different Tetriminos are placed into a virtual bag, then shuffled into a random order. This order is the sequence that the bag “feeds” the Next Queue. Every time a new Tetrimino is generated and starts its fall within the Matrix, the Tetrimino at the front of the line in the bag is placed at the end of the Next Queue, pushing all Tetriminos in the Next Queue forward by one. The bag is refilled and reshuffled once it is empty.

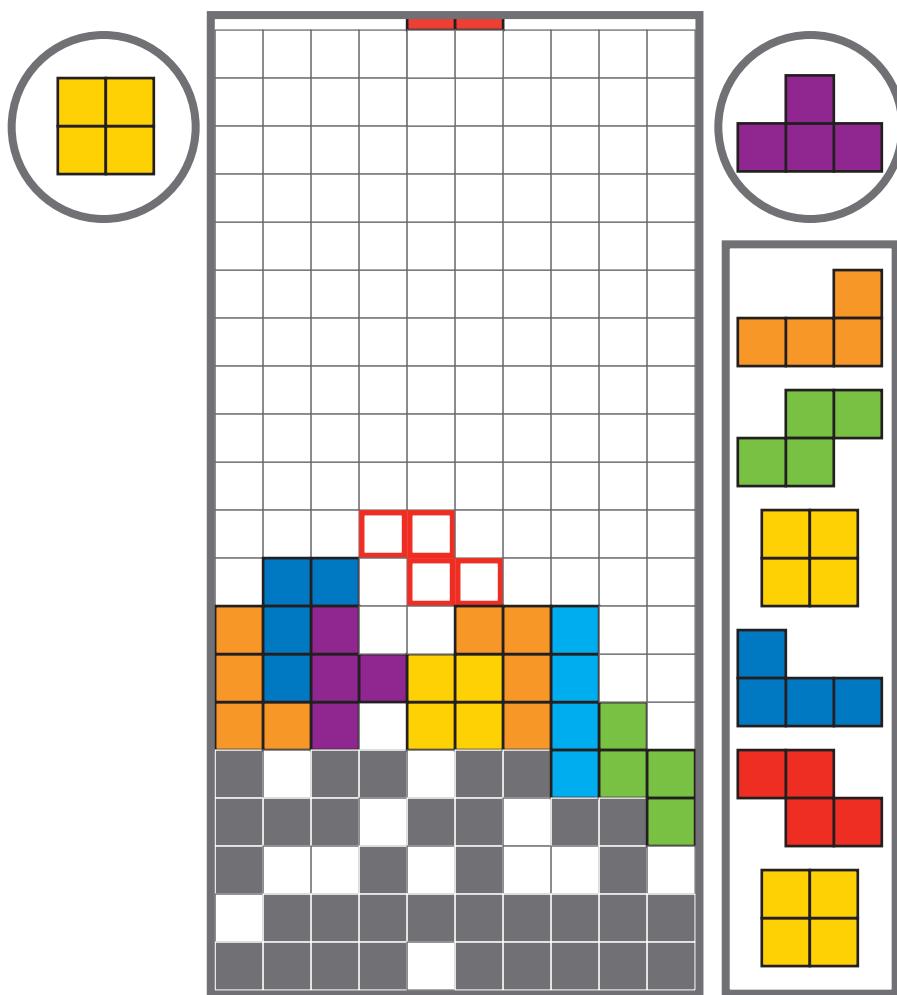
3.4 STARTING LOCATION & ORIENTATION

Tetriminos are all generated North Facing (just as they appear in the Next Queue) on the 21st and 22nd rows, just above the Skyline. There are 10 cells across the Matrix, and every Tetrimino that is three Minos wide is generated on the 4th cell across and stretches to the 6th. This includes the T-Tetrimino, L-Tetrimino, J-Tetrimino, S-Tetrimino and Z-Tetrimino. The I-Tetrimino and O-Tetrimino are exactly centered at generation. The I-Tetrimino is generated on the 21st row (*not* 22nd), stretching from the 4th to 7th cells. The O-Tetrimino is generated on the 5th and 6th cell.

Tetris® Design Guideline

March, 2009

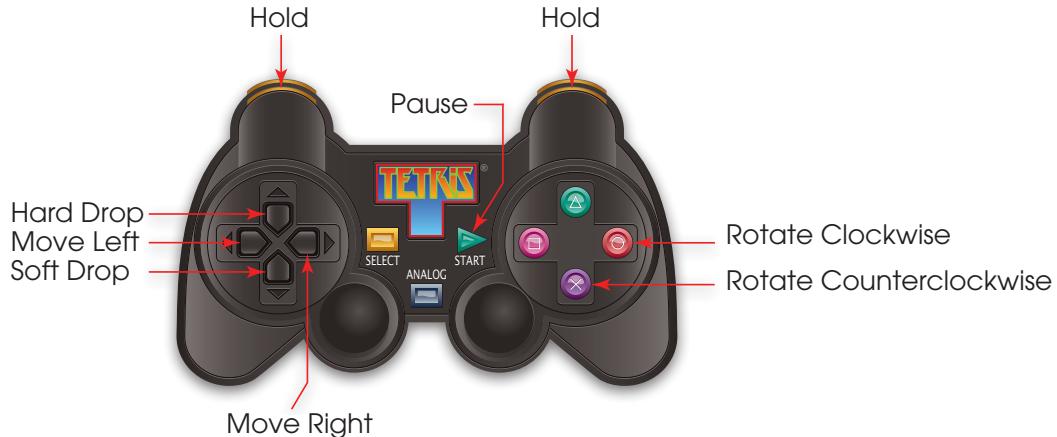
As soon as a Tetrimino is generated, three things *immediately* happen: 1) the Tetrimino drops one row if no existing Block is in its path, 2) the player is able to move and rotate the Tetrimino, and 3) the Ghost Piece (if turned on) appears below, North Facing. If an existing Block is in the Tetrimino's path, the Tetrimino does not drop one row immediately, however, a few pixels of the generated Tetrimino are shown (hardware permitting) to help the player manipulate it above the Skyline.



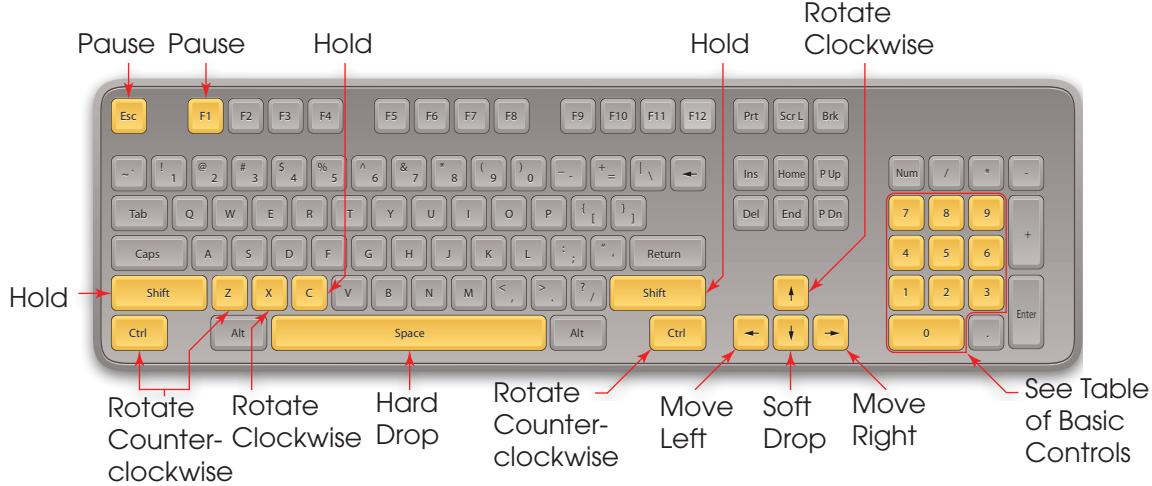
4. CONTROLS

The following are the default control schemes for various input devices. The player is allowed to change the control keys if the hardware permits it.

Joystick



Keyboard



Tetris® Design Guideline

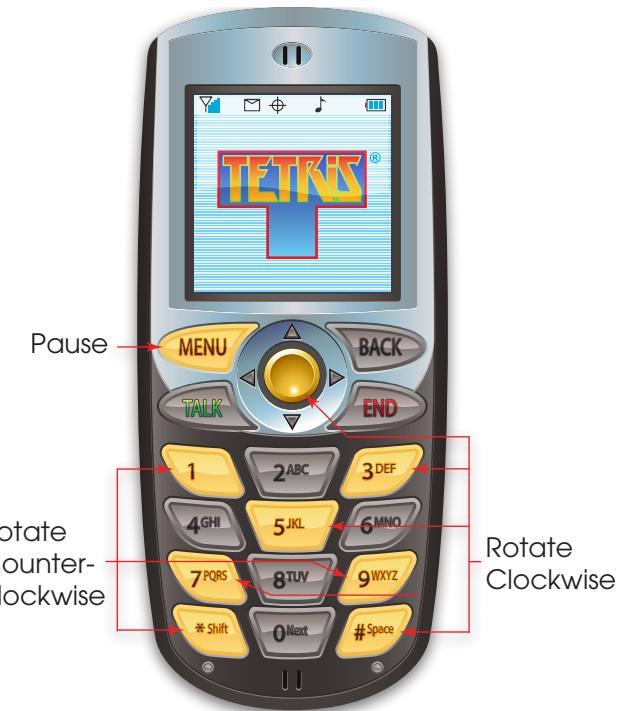
March, 2009

Mobile Phone

Tetrimino Movement



Tetrimino Rotation



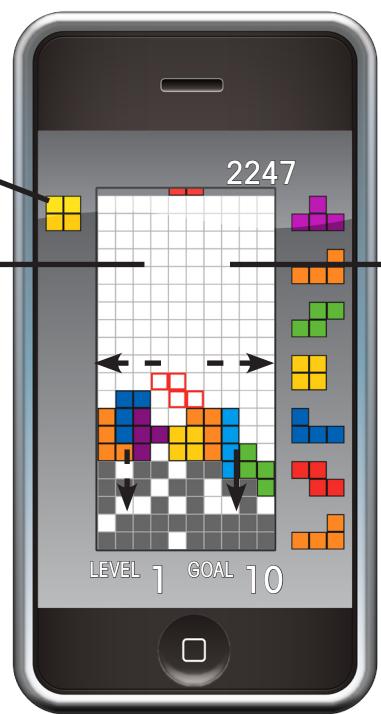
Touch Screen (Tap and Drag)

Tap the Hold Queue to hold the falling Tetrimino

Tap the left side of the screen to rotate the Tetrimino counter-clockwise

Drag left anywhere on the screen to move the Tetrimino left

Drag down anywhere on the screen to start a Soft Drop. Continue pressing the screen to continue the Soft Drop.



Tap the right side of the screen to rotate the Tetrimino clockwise

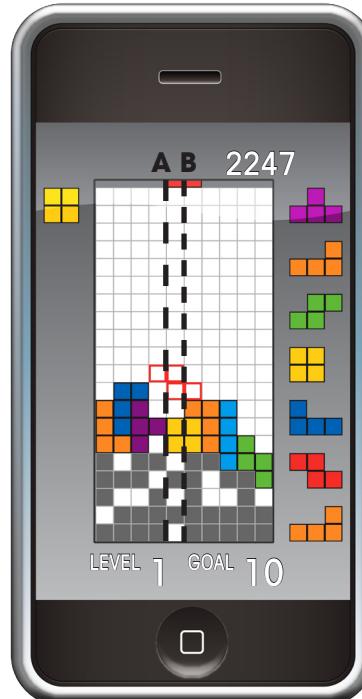
Drag right anywhere on the screen to move the Tetrimino right

Flick down anywhere on the screen to Hard Drop the Tetrimino

When a Tetrimino generates, any tap to the left of Line A is considered a counter-clockwise rotation; any tap to the right of Line A is considered a clockwise rotation.

If the Tetrimino is rotated counter-clockwise, Line B is made the dividing line between counter-clockwise and clockwise rotations. This continues until the Tetrimino is rotated clockwise, at which time the dividing line moves back to Line A.

At Lock Down, the dividing line is reset to Line A.

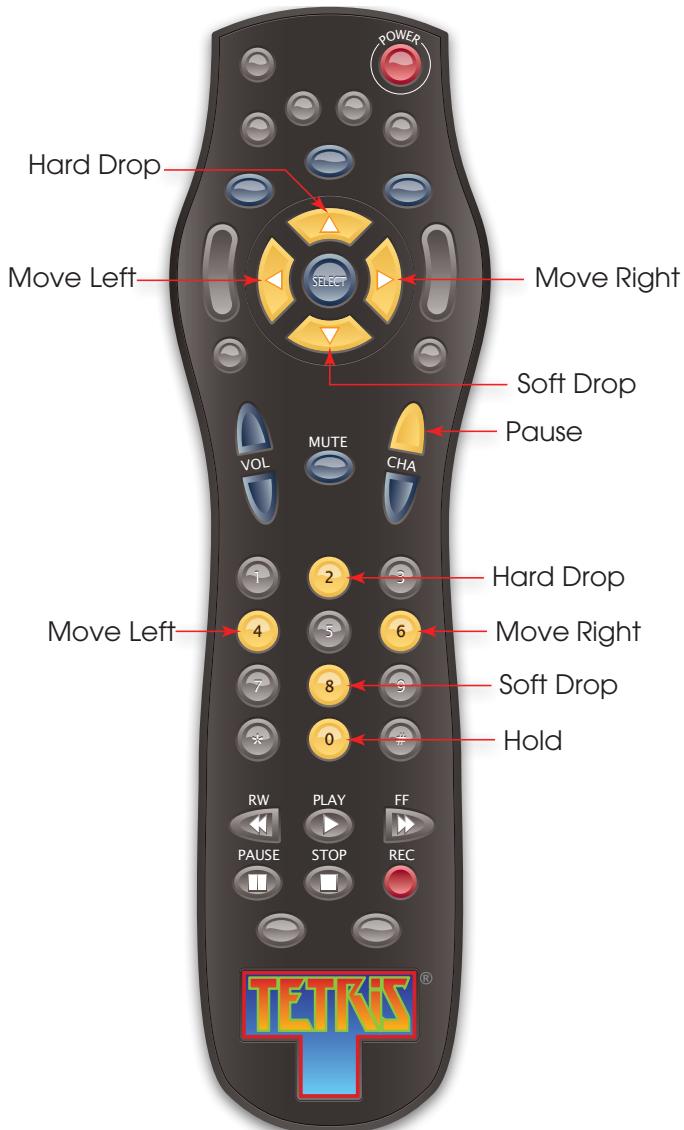


Tetris® Design Guideline

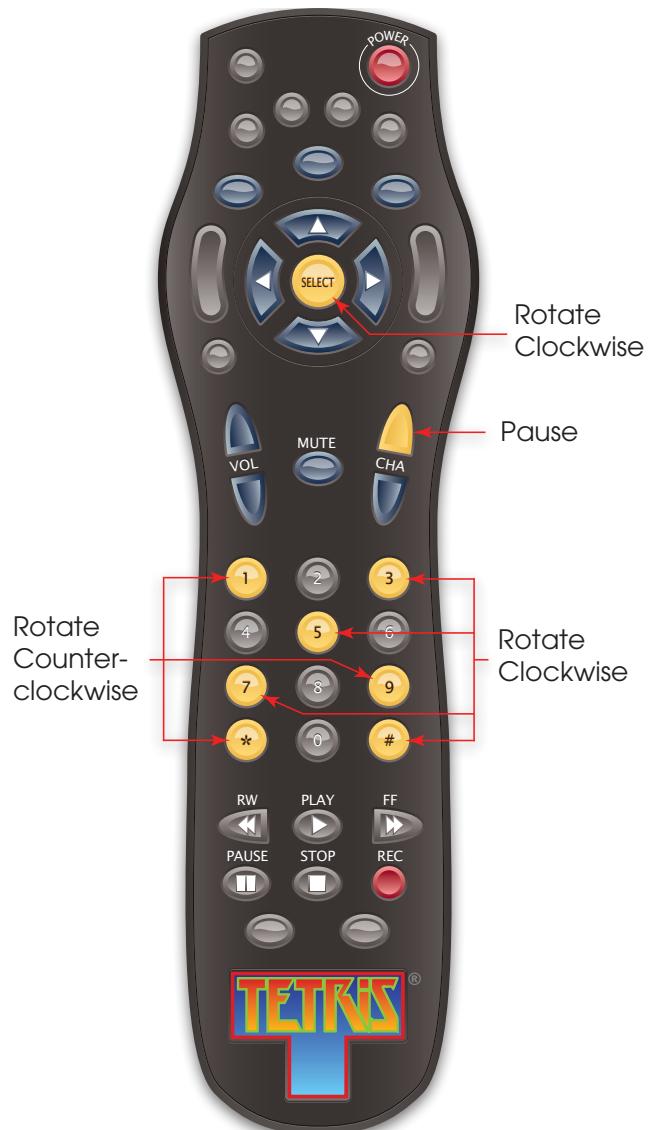
March, 2009

Cable Remote

Tetrimino Movement



Tetrimino Rotation



Note: If one of the designated control buttons is not present on a certain remote, use a button in the same area.

4.1 TABLE OF BASIC CONTROLS

Control Function	Joystick	Keyboard	Mobile Phone/ Cable Remote ¹
Move Tetrimino LEFT	Directional Pad LEFT	LEFT Arrow, Numpad 4	Directional Pad LEFT / Button 4
Move Tetrimino RIGHT	Directional Pad RIGHT	RIGHT Arrow, Numpad 6	Directional Pad RIGHT / Button 6
Hard Drop	Directional Pad UP	Space Bar, Numpad 8	Directional Pad UP / Button 2
Soft Drop	Directional Pad DOWN	DOWN Arrow, Numpad 2	Directional Pad DOWN / Button 8
Rotate Tetrimino Clockwise	Outer (Right) Button	UP Arrow, X, Numpad 1, 5, 9	Directional Pad OK ² or Select / Buttons 3, 5, 7, or #
Rotate Tetrimino Counterclockwise	Inner (Left) Button	Control, Z, Numpad 3, 7	Buttons 1, 9, or *
Hold	Button 3 / Shoulder Buttons	Shift, C, Numpad 0	Button 0
Pause Game	Start / Select	Escape, F1	Extra or MENU Button / Channel Up

¹Cable remote key/button availability may differ between remotes. In these situations, it is advisable to stick with this scheme as much as possible. Any necessary changes will be approved on an individual basis.

²If there is no center OK button on a phone's directional pad, then the UP button is used for Rotate Clockwise instead of Hard Drop (button 2 is used for Hard Drop).

Tetris® Design Guideline

March, 2009

5. TETRIMINO MANIPULATION

Only one Tetrimino falls within the Matrix at any given time. The player can move, rotate, Soft Drop, Hard Drop, and Hold the falling Tetrimino (i.e., the Tetrimino in play). When the Tetrimino first lands on a Surface, there is a time limit before it Locks Down. The three Lock Down options are explained at the end of this section.

5.1 MOVEMENT

The Tetrimino in play falls from just above the Skyline one cell at a time, and moves left and right one cell at a time. Each Mino of a Tetrimino “snaps” to the appropriate cell position at the completion of a move, although intermediate Tetrimino movement appears smooth. Only right, left, and downward movement are allowed. Movement into occupied cells and Matrix walls and floors is not allowed.

5.2 AUTO-REPEAT

Tapping the move button allows a single cell movement of the Tetrimino in the direction pressed. Holding down the move button triggers an Auto-Repeat movement that allows the player to move a Tetrimino from one side of the Matrix to the other in about 0.5 seconds. This is essential on higher levels when the Fall Speed of a Tetrimino is very fast.

There must be a slight delay between the time the move button is pressed and the time when Auto-Repeat kicks in, roughly 0.3 seconds. This delay prevents unwanted extra movement of a Tetrimino. Auto-Repeat only affects Left/Right movement. Auto-Repeat continues to the Next Tetrimino (after Lock Down) as long as the move button remains pressed.

In addition, when Auto-Repeat begins, and the player then holds the opposite direction button, the Tetrimino must then begin moving the opposite direction with the initial delay. This mainly applies to devices with movement buttons—such as a keyboard or mobile phone—where more than one direction button is able to be pressed simultaneously. When any single button is then released, the Tetrimino should again move in the direction still held, with the Auto-Repeat delay of roughly 0.3 seconds applied once more.

5.3 ROTATION

Tetriminos can rotate clockwise and counterclockwise using the Super Rotation System. This system allows Tetrimino rotation in situations that the original Classic Rotation System did not allow, such as rotating against walls. See the **Super Rotation System** section in Appendix A for more details.

Each time a rotation button is pressed, the Tetrimino in play rotates 90 degrees in the clockwise or counterclockwise direction. Rotation can be performed while the Tetrimino is Auto-Repeating left or right. There is no Auto-Repeat for rotation itself.

5.4 HARD DROP

The Hard Drop command instantly drops the Tetrimino and locks it down on the Surface directly below it. The time it takes for a Hard Dropped Tetrimino to fall from its current location to Lock Down is 0.0001 seconds. There is no Auto-Repeat for a Hard Drop.

5.5 SOFT DROP

When the Soft Drop command is pressed, the Tetrimino in play drops at a rate 20 times faster than the normal Fall Speed, measured in seconds per line. The Tetrimino resumes its normal Fall Speed once the Soft Drop button is released. For example, if the normal Fall Speed is 0.5 seconds per line, then the Soft Drop speed is $(0.5 / 20) = 0.025$ seconds per line.

Note that if the player Soft Drops a Tetrimino until it lands on a Surface, Lock Down does not occur until the Lock Down Timer hits zero.

Press and hold the Soft Drop button to continue the downward movement. Soft Drop continues to the Next Tetrimino (after Lock Down) as long as the button remains pressed.

5.6 HOLD

Using the Hold command places the Tetrimino in play into the Hold Queue. The previously held Tetrimino (if one exists) will then start falling from the top of the Matrix, beginning from its generation position and North Facing orientation. Only one Tetrimino may be held at a time.

A Lock Down must take place between Holds. For example, at the beginning, the first Tetrimino is generated and begins to fall. The player decides to hold this Tetrimino. Immediately the Next Tetrimino is generated from the Next Queue and begins to fall. The player must first Lock Down this Tetrimino before holding another Tetrimino. In other words, you may not Hold the same Tetrimino more than once.

5.7 EXTENDED PLACEMENT LOCK DOWN

This is the default Lock Down setting in the Options menu. Multiplayer and Arcade variations of Tetris must use this type of Lock Down.

Once the Tetrimino in play lands on a Surface in the Matrix, the Lock Down Timer starts counting down from 0.5 seconds. Once it hits zero, the Tetrimino Locks Down and the Next Tetrimino's generation phase starts. The Lock Down Timer resets to 0.5 seconds if the player simply moves or rotates the Tetrimino. In Extended Placement, a Tetrimino gets 15 left/right movements or rotations before it Locks Down, regardless of the time left on the Lock Down Timer. However, if the Tetrimino falls one row below the lowest row yet reached, this counter is reset. In all other cases, it is not reset.

Note: If a Tetrimino falls to its lowest line and then goes above this line, it will continue to use its 15 movements/rotations. Once these movements/rotations have been used, the Lock Down Timer will not be reset and the Tetrimino will Lock Down immediately on the first Surface it touches. If it does not touch a Surface, it may be moved/rotated further. It will again receive a total of 15 movements/rotations if it falls to a line below the previous lowest line.

5.8 INFINITE PLACEMENT LOCK DOWN

Once the Tetrimino in play lands on a Surface in the Matrix, the Lock Down Timer starts counting down from 0.5 seconds. Once it hits zero, the Tetrimino Locks Down and the Next Tetrimino's generation phase starts. However, the Lock Down Timer resets to 0.5 seconds if the player simply moves or rotates the Tetrimino. Thus, Infinite Placement allows the player to continue movement and rotation of a Tetrimino as long as there is an actual change in its position or orientation before the timer expires.

Tetris® Design Guideline

March, 2009

5.9 CLASSIC LOCK DOWN

Classic Lock Down rules apply if Infinite Placement and Extended Placement are turned off. Like Infinite Placement, the Lock Down Timer starts counting down from 0.5 seconds once the Tetrimino in play lands on a Surface. The y-coordinate of the Tetrimino must decrease (i.e., the Tetrimino falls further down in the Matrix) in order for the timer to be reset.

6. LEVELS & GOALS

Typical Tetris variants feature 15 levels of play (from 1 to 15). A Level Up occurs when the player clears the required number of lines per level, or the Goal.

The current level affects both Fall Speed and scoring in Tetris (see next section). As levels advance, the Fall Speed increases, and more points are awarded for actions such as Line Clears and T-Spins.

We recommend you choose the type of goal system that best suits the variant/platform. There are two listed in this guideline: the Fixed Goal System requires 10 lines each level through level 15, and the Variable Goal System requires that the player clears 5 lines at level 1, 10 lines at level 2, 15 at level 3 and so on, adding an additional five lines to the Goal each level through 15. Thus, with the Fixed Goal System, the player must clear 150 lines through level 15, whereas with the Variable Goal System of adding 5 lines per level, the player is required to clear 600 lines by level 15. This system also includes line bonuses to help speed up the game, as explained below.

The player must also have the option of starting from any level by changing the starting level in the Main Menu. For the Fixed Goal System, for any starting level greater than one, the player's Goal is equal to the total number of lines they would normally clear on their way prior to the current level, in addition to the current level's normal Goal.

Example: If the player begins on level 4, in order to advance to level 5 they are required to clear the 30 lines through level 3 plus the 10 lines through level 4, for a total of 40 lines, where they then reach level 5 with a Goal of 10. For Level > 1, Goal = 10 x Level for that level only. And, *since scoring is dependent on level, starting at a higher level results in more total points at the end of the game.*

When starting from Level 2 or higher in the Variable Goal System: Goal = Level x 5. Thus players playing the entire game from level 1 through 15 will achieve the higher score on average.

6.1 VARIABLE GOAL SYSTEM & LINE CLEARS

To speed up the process of "clearing" 600 lines, in the Variable Goal System the number of Line Clears awarded for any action is directly based off the score of the action performed (*score at level 1 / 100 = Total Line Clears*), such as a T-Spin or Tetris. This also has the side benefit of motivating players to use higher scoring actions such as T-Spins and Tetrises. The following is a table of awarded Line Clears for the Variable Goal System:

Action	Awarded Line Clears	Action	Awarded Line Clears
Single / Mini T-Spin	1	T-Spin Double	12
Mini T-Spin Single	2	T-Spin Triple	16
Double	3	Back-to-Back Bonus	0.5 x Total Line Clears
T-Spin	4	<i>Note:</i> Normal Back-to-Back rules apply. See the table in the Scoring section for the list of Back-to-Back actions.	
Triple	5		
Tetris / T-Spin Single	8		

Tetris® Design Guideline

March, 2009

7. FALL & DROP SPEEDS

Normal Fall Speed of Tetriminos

Level	Fall Speed (seconds per line)
1	1.0
2	0.793
3	0.618
4	0.473
5	0.355
6	0.262
7	0.190
8	0.135
9	0.094
10	0.064
11	0.043
12	0.028
13	0.018
14	0.011
15	0.007

Once a Tetrimino is generated, it immediately drops one row (if no existing Block is in its path). From here, it begins its descent to the bottom of the Matrix. The Tetrimino will fall at its normal Fall Speed whether or not it is being manipulated by the player. The normal Fall Speed is defined here to be *the time it takes a Tetrimino to fall by one line*. The current level of the game determines the normal Fall Speed using the following equation:

$$(0.8 - ((\text{level} - 1) * 0.007))^{\text{(level}-1)}$$

Approximate calculations of the Fall Speed for levels 1 through 15 are shown in the table to the left.

7.1 DROP SPEEDS

The Soft Drop speed is suggested to be 20 times faster than the normal Fall Speed of the Tetrimino. The suggested Hard Drop speed is 0.0001 seconds.

8. SCORING

The player scores points by performing Single, Double, Triple, and Tetris Line Clears, as well as T-Spins and Mini T-Spins. Soft and Hard Drops also award points. There is a special bonus for Back-to-Backs, which is when two actions such as a Tetris and T-Spin Double (see complete list below) take place without a Single, Double, or Triple Line Clear occurring between them. Scoring for Line Clears, T-Spins, and Mini T-Spins are level dependent, while Hard and Soft Drop point values remain constant. Levels typically start at 1 and end at 15.

Note: An added requirement for this year's Tetris products is to include a demonstration within the actual application of all of the following point-scoring actions:

Action	Action Total	Description
Single	100 x Level	1 line of Blocks is cleared.
Double	300 x Level	2 lines of Blocks are simultaneously cleared.
Triple	500 x Level	3 lines of Blocks are simultaneously cleared.
Tetris	800 x Level	4 lines of Blocks are simultaneously cleared.
Mini T-Spin	100 x Level	An easier T-Spin with no Line Clear.
Mini T-Spin Single	200 x Level	An easier T-Spin clearing 1 line of Blocks.
T-Spin	400 x Level	T-Tetrimino is spun into a T-Slot with no Line Clear.
T-Spin Single	800 x Level	T-Spin clearing 1 line of Blocks.
T-Spin Double	1200 x Level	T-Spin simultaneously clearing 2 lines of 10 Blocks.
T-Spin Triple	1600 x Level	T-Spin simultaneously clearing 3 lines of 10 Blocks.
Back-to-Back Bonus	0.5 x Action Total	Bonus for Tetris, T-Spin Line Clears ¹ , and Mini T-Spin Line Clears ¹ performed consecutively in a B2B sequence. See Back-to-Back Example for a better understanding.
Soft Drop	1 x n	Tetrimino is Soft Dropped for n lines
Hard Drop	2 x m	Tetrimino is Hard Dropped for m lines

¹T-Spins and Mini T-Spins that do not clear any lines do not receive the Back-to-Back Bonus; instead they are scored as normal. They also cannot start a Back-to-Back sequence, however, they do not break an existing Back-to-Back sequence and so are included in the Back-to-Back description.

8.1 BACK-TO-BACK EXAMPLE

The total number of points the player receives for achieving a Tetris, T-Spin Double, T-Spin, Tetris, and a T-Spin Single consecutively at Level 1 is:

Tetris	+	T-Spin Double	+	B2B Bonus	+	T-Spin	+	Tetris	+	B2B Bonus	+	T-Spin Single	+	B2B Bonus	=	Total Score
800	+	(1200	+	600)	+	400	+	(800	+	400)	+	(800	+	400)	=	5400

Note: The first Line Clear in the Back-to-Back sequence does not receive the Back-to-Back Bonus. Only consecutive qualifying Back-to-Back Line Clears after the first in the sequence receive the Back-to-Back Bonus.

A Back-to-Back sequence is only broken by a Single, Double, or Triple Line Clear. Locking down a Tetrimino without clearing a line or holding a Tetrimino does not break the Back-to-Back sequence.

Tetris® Design Guideline

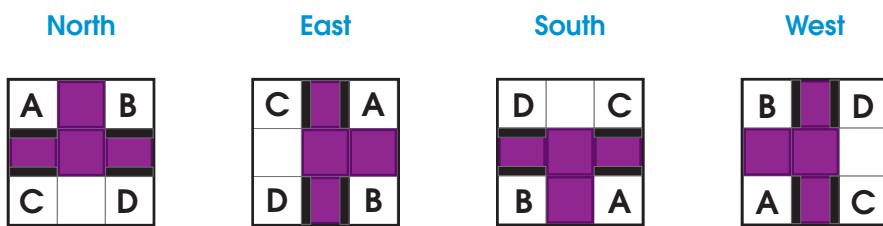
March, 2009

9. T-SPINS

A T-Spin or Mini T-Spin is a special rotation of the T-Tetrimino into a T-Slot, and when accomplished, awards a scoring or line bonus in most variants. A T-Slot is defined as any Block formation such that when the T-Tetrimino is spun in it, any three of the four cells diagonally adjacent to the center of the T-Tetrimino are occupied by existing Blocks. In order to be considered a T-Spin or Mini T-Spin, the T-Tetrimino must spin clockwise or counterclockwise first (it cannot merely be moved or dropped into a T-Slot). In addition to a scoring or other bonus, T-Spins and Mini T-Spins can also continue a Back-to-Back sequence.

9.1 RECOGNITION

In the following diagrams, each letter corresponds to the side of a Mino in the T-Tetrimino:



9.1.1 T-Spin

A rotation is considered a T-Spin if any of the following conditions are met:

- Sides A and B + (C or D) are touching a Surface when the Tetrimino Locks Down.
- The T-Tetrimino fills a T-Slot completely with no holes.
- Rotation Point 5 is used to rotate the Tetrimino into the T-Slot (see the **Super Rotation System** section in Appendix A). Any further rotation will be considered a T-Spin, not a Mini T-Spin.

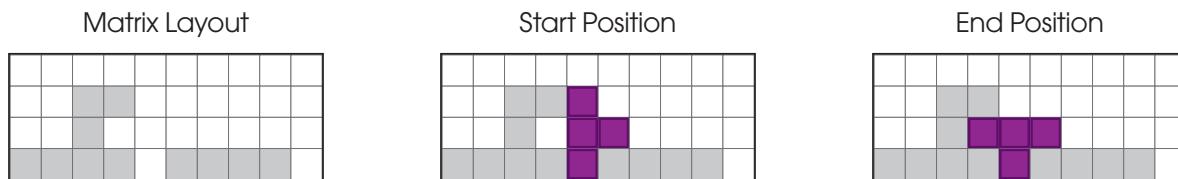
9.1.2 Mini T-Spin

A rotation is considered a Mini T-Spin if either of the following conditions are met:

- Sides C and D + (A or B) are touching a Surface when the Tetrimino Locks Down.
- The T-Tetrimino creates holes in a T-Slot. However, if Rotation Point 5 was used to rotate the Tetrimino into the T-Slot, the rotation is considered a T-Spin (see previous section).

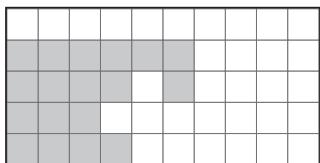
The following are some examples of the types of T-Spins and Mini T-Spins in Tetris:

T-Spin / E-S (Rotates Clockwise / Point 1)

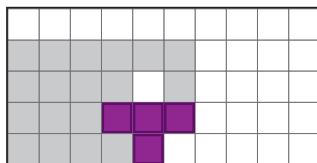


T-Spin / S-W (Rotates Clockwise / Point 1)

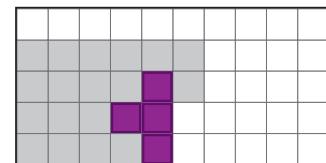
Matrix Layout



Start Position

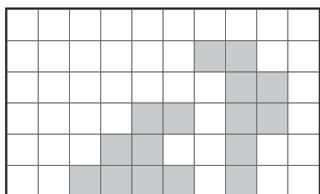


End Position

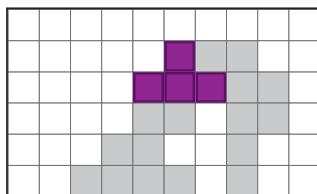


T-Spin / N-W (Rotates Counterclockwise / Point 5)

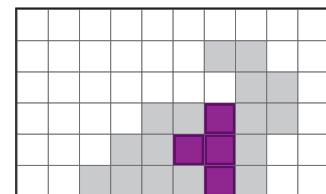
Matrix Layout



Start Position

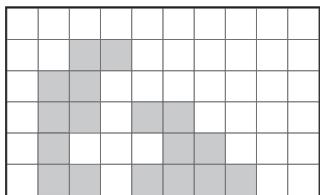


End Position

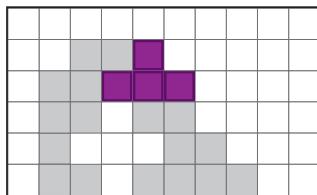


T-Spin / N-E (Rotates Clockwise / Point 5)

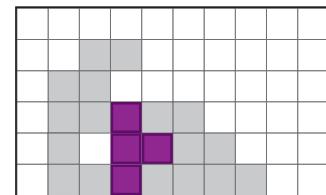
Matrix Layout



Start Position

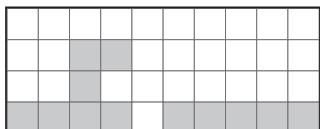


End Position

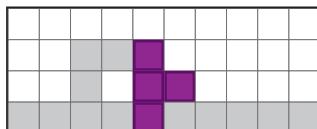


T-Spin Single / E-S (Rotates Clockwise / Point 1)

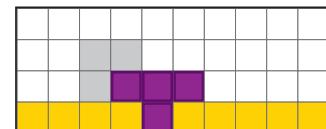
Matrix Layout



Start Position

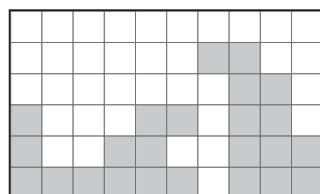


End Position

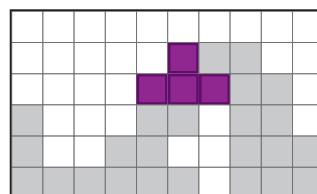


T-Spin Single / N-W (Rotates Counterclockwise / Point 5)

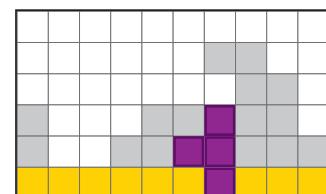
Matrix Layout



Start Position



End Position

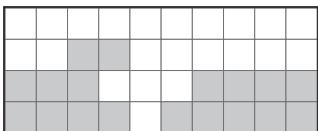


Tetris® Design Guideline

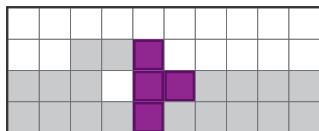
March, 2009

T-Spin Double / E-S (Rotates Clockwise / Point 1)

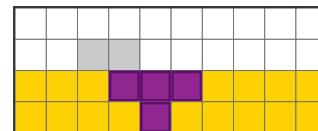
Matrix Layout



Start Position

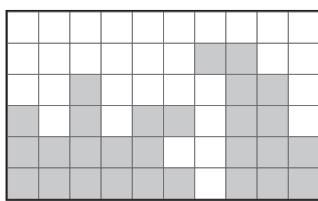


End Position

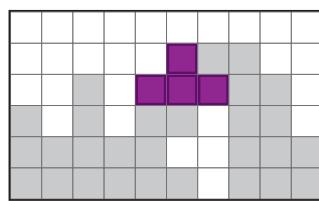


T-Spin Double / N-W (Rotates Counterclockwise / Point 5)

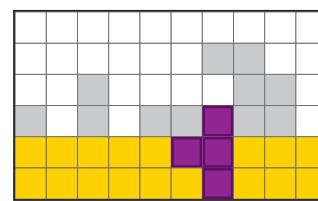
Matrix Layout



Start Position

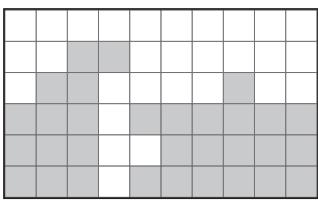


End Position

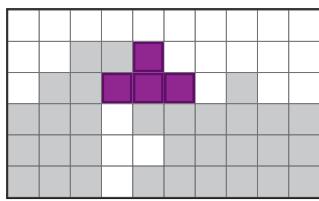


T-Spin Triple / N-E (Rotates Clockwise / Point 5)

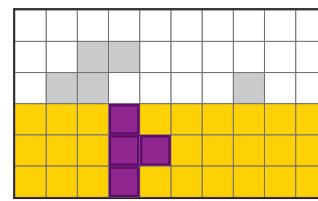
Matrix Layout



Start Position

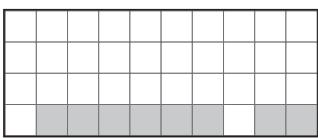


End Position

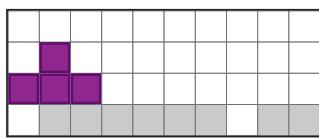


Mini T-Spin / N-E (Rotates Clockwise / Point 2)

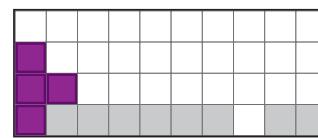
Matrix Layout



Start Position

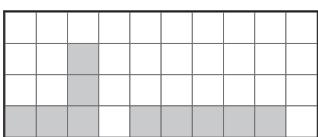


End Position

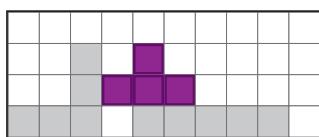


Mini T-Spin / N-E (Rotates Clockwise / Point 2)

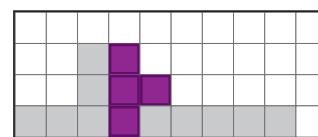
Matrix Layout



Start Position

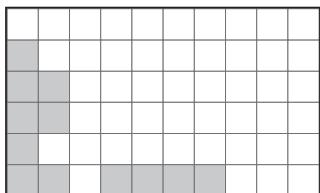


End Position

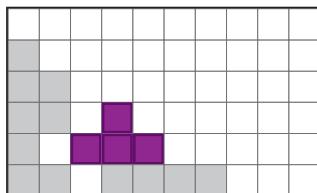


Mini T-Spin / N-E (Rotates Clockwise / Point 2)

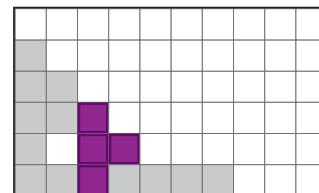
Matrix Layout



Start Position

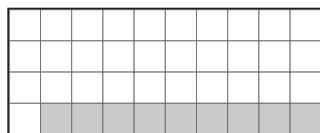


End Position

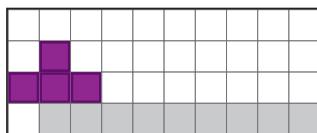


Mini T-Spin Single / N-E (Rotates Clockwise / Point 2)

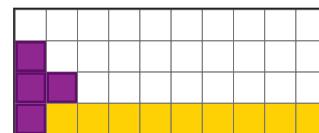
Matrix Layout



Start Position

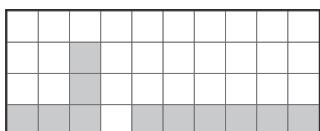


End Position

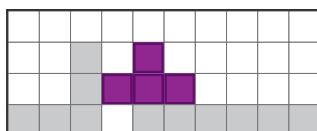


Mini T-Spin Single / N-E (Rotates Clockwise / Point 2)

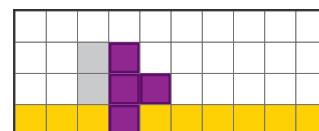
Matrix Layout



Start Position

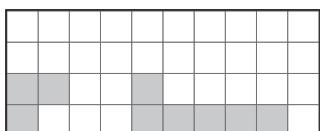


End Position

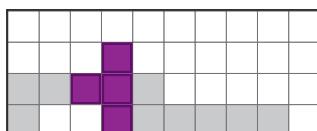


Mini T-Spin / W-N (Rotates Clockwise / Point 3)

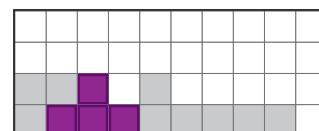
Matrix Layout



Start Position

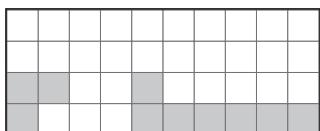


End Position

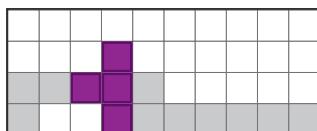


Mini T-Spin Single / W-N (Rotates Clockwise / Point 3)

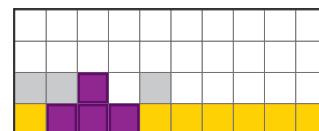
Matrix Layout



Start Position



End Position



March, 2009

10. GAME OVER CONDITIONS

The following are the conditions which dictate the Game Over Condition:

The player's game is over when a Tetrimino Locks Out or Blocks Out, or when an existing Block Tops Out. This occurs when:

- a) an opponent's Line Attacks force existing Blocks past the top of the Buffer Zone (Top Out)
- b) the player locks a whole Tetrimino down above the Skyline (Lock Out), or
- c) one of the starting cells of the Next Tetrimino is blocked by an existing Block (Block Out).

The Buffer Zone is an area above the Skyline that is another 20 rows high. There are seven general situations involving this Buffer Zone (each referring to a diagram on the next page):

1. Lock Down - Normal (*Game Not Over*)

The Tetrimino in play Locks Down completely below the Skyline inside the Matrix. Most every Tetris game will be under this condition. This is not a Game Over Condition, and the game continues.

2. Lock Down - Peeking (*Game Not Over*)

The Tetrimino in play Locks Down with at least one of its Blocks both below and above the Skyline. This is not a Game Over Condition, and the game continues.

3. Playing Above Skyline (*Game Not Over*)

The player may move or rotate the Tetrimino in play above the Skyline, an imaginary line separating the Matrix from the Buffer Zone.

4. Existing Blocks Forced Up (*Game Not Over*)

When existing Blocks are forced above the Skyline, but are still below the top of the Buffer Zone, it is not considered Game Over.

5. Top Out (*Game Over*)

This Game Over Condition occurs when an opponent's Line Attack forces your Blocks *past* the top of the 20-line Buffer Zone.

It is highly unlikely that this will ever occur, since Lock Out (see #6) or Block Out (see #7) will likely occur before a Block ever gets pushed out of the Buffer Zone.

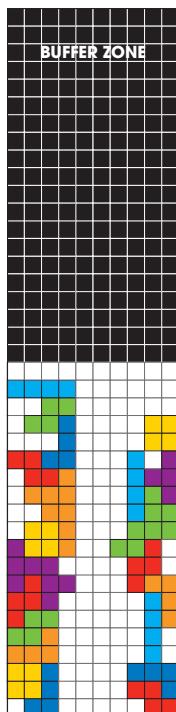
6. Lock Out (*Game Over*)

This Game Over Condition occurs when a whole Tetrimino Locks Down above the Skyline.

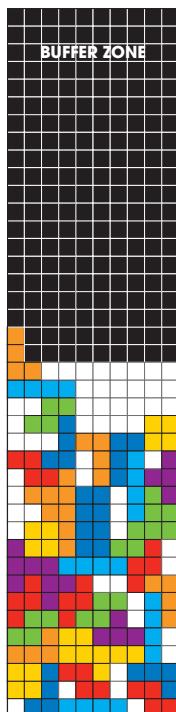
7. Block Out (*Game Over*)

This Game Over Condition occurs when part of a newly-generated Tetrimino is blocked due to an existing Block in the Matrix.

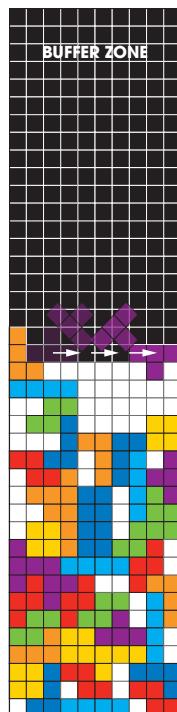
10.1 GAME OVER CONDITION DIAGRAMS



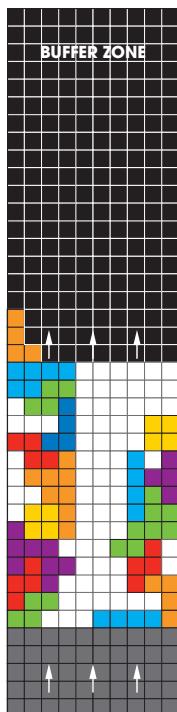
1. Lock Down / Normal



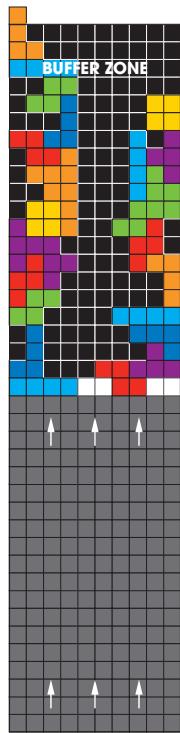
2. Lock Down / Peeking



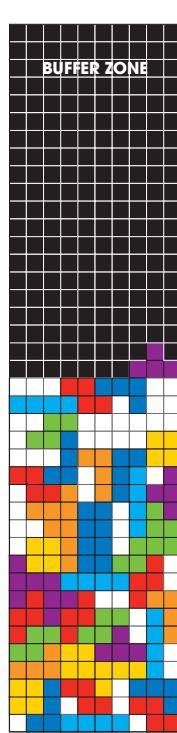
3. Playing Above Skyline



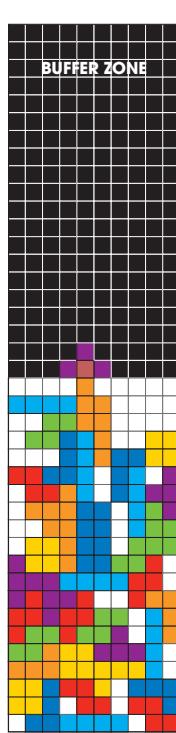
4. Existing Blocks
Forced Up



5. Top Out /
Game Over



6. Lock Out /
Game Over



7. Block Out /
Game Over

Tetris® Design Guideline

March, 2009

11. GAME OVER EVENTS

When the platform allows, Game Over Events such as End Rewards or the High Score Table should be included if the player has done particularly well in the game.

11.1 END REWARDS

When the player achieves an above average score, or attains a difficult to reach level, the player should be rewarded with a congratulatory message or screen including special graphic effects. This encourages both repeat play and player improvement.

One example could be the number of fireworks displayed in the background being directly related to the player's score.

11.2 HIGH SCORE TABLE

At the end of the game, if a high score, level or time was achieved, the player should be able to enter their name or initials into the High Score Table. The High Score Table should then appear with the top players for each variant included. The table should include the player's name, as well as level, score, or goal attained, the number of lines cleared, etc. Columns should be relevant to the Tetris variant.

The High Score Table should be retained in memory and made accessible via the Main Menu.

12. MAIN TETRIS VARIANTS

The three main Tetris variants are as follows: **Marathon**, **Sprint**, and **Ultra**. For information on other authorized variants, refer to the *Tetris Variant Concepts*.

Note: Any Tetris game (which may include any number of variants) should have the name "Tetris" in front of it, in order to better catalogue and search for the name of the game. Variants within the game do not need the name Tetris in front of them.

12.1 MARATHON

This is the traditional game of Tetris. Here, the player competes purely for points over 15 levels of play, at which point the game ends. Each Tetris variant using the Marathon method of game play has a specific Level Up condition.

12.2 SPRINT (ALSO KNOWN AS 40 LINES)

The player chooses a starting level, and competes to clear a set number of lines (typically 40) in the shortest amount of time. The game ends when a Game Over Condition is met, or when the player clears the set number of lines. This game does not Level Up.

12.3 ULTRA

The player's objective is to a) score as many points, OR b) clear as many lines as possible within a two or three minute time span. The game ends when a Game Over Condition is met, or when the time limit expires. This game does not Level Up.

March, 2009

13. VISUAL/SOUND EFFECTS & MUSIC

13.1 VISUAL EFFECTS & ANIMATION

The following visual effects should be implemented in order to enhance the game play experience:

13.1.1 Line Clear Effects

When a line is cleared, a visual effect should illustrate the line completion and line removal. The more lines cleared at once, the more intense the visual effect.

13.1.2 Hard Drop Trail

If hardware permits, a translucent trailing shadow can follow the path of a Tetrimino that was just Hard Dropped. This helps the player visualize a Hard Drop.

13.1.3 Lock Down

A Tetrimino in play should change texture, darken, or flash when it Locks Down. A texture change or darkening should also differentiate all Locked Down Blocks with Tetriminos/Minos in play.

13.1.4 Background Graphics & Animations

Background graphics should not detract from game play in any way. Background graphics and animations should make clear a change in Level or impressive game maneuvers, such as a Tetris, T-Spin, or Back-to-Back.

13.1.5 Action Notifications

Actions such as Tetris, T-Spins, T-Spin Singles/Doubles/Triples, Mini T-Spins, Mini T-Spin Singles, and Back-to-Backs should have a quick but aesthetically pleasing on-screen text notification of the action.

The text should explicitly state the name of the action, for example: "T-Spin Single" or "Back-to-Back T-Spin Double". For Mini T-Spins, the text can indicate either "Mini T-Spin" or just "T-Spin".

Up to level 10, the notification may appear inside the Matrix. After level 10, the notification must appear somewhere in the user interface, outside of the Matrix.

13.1.6 Pausing the Game

Pressing the Pause button stops game play instantly and hides the Matrix, Next Queue, and Hold Queue contents. The word "Pause" should be prominently displayed on screen. Pressing the Pause button again resumes the game.

13.2 SOUND EFFECTS

The minimum sound effect requirements are:

- Tetrimino Rotation (clockwise and counterclockwise)
- Tetrimino Movement (left and right)
- Tetrimino Landing on a Surface or Touching a Wall/Object
- Tetrimino Lock Down
- Line Clear
- Game Over

Depending on hardware capabilities, the following actions should also have sound effects to enhance the game play experience:

- Single Line Clear
- Double Line Clear
- Triple Line Clear
- Tetris Line Clear
- T-Spin, T-Spin Single, T-Spin Double, T-Spin Triple, Mini T-Spin, Mini T-Spin Single
- Back-to-Back
- Soft Drop
- Hard Drop
- Hold
- Movement Failure (Blocked by obstacle)
- Rotation Failure (Blocked by obstacle)
- Level Up
- Game Over
- Other Variant Specific Actions (cascades, stickiness, avalanche, etc.)

13.3 BACKGROUND MUSIC (BGM)

The following Russian melody must be included in some arrangement and must be set as the default BGM.

- Korobeiniki (Коробейники)

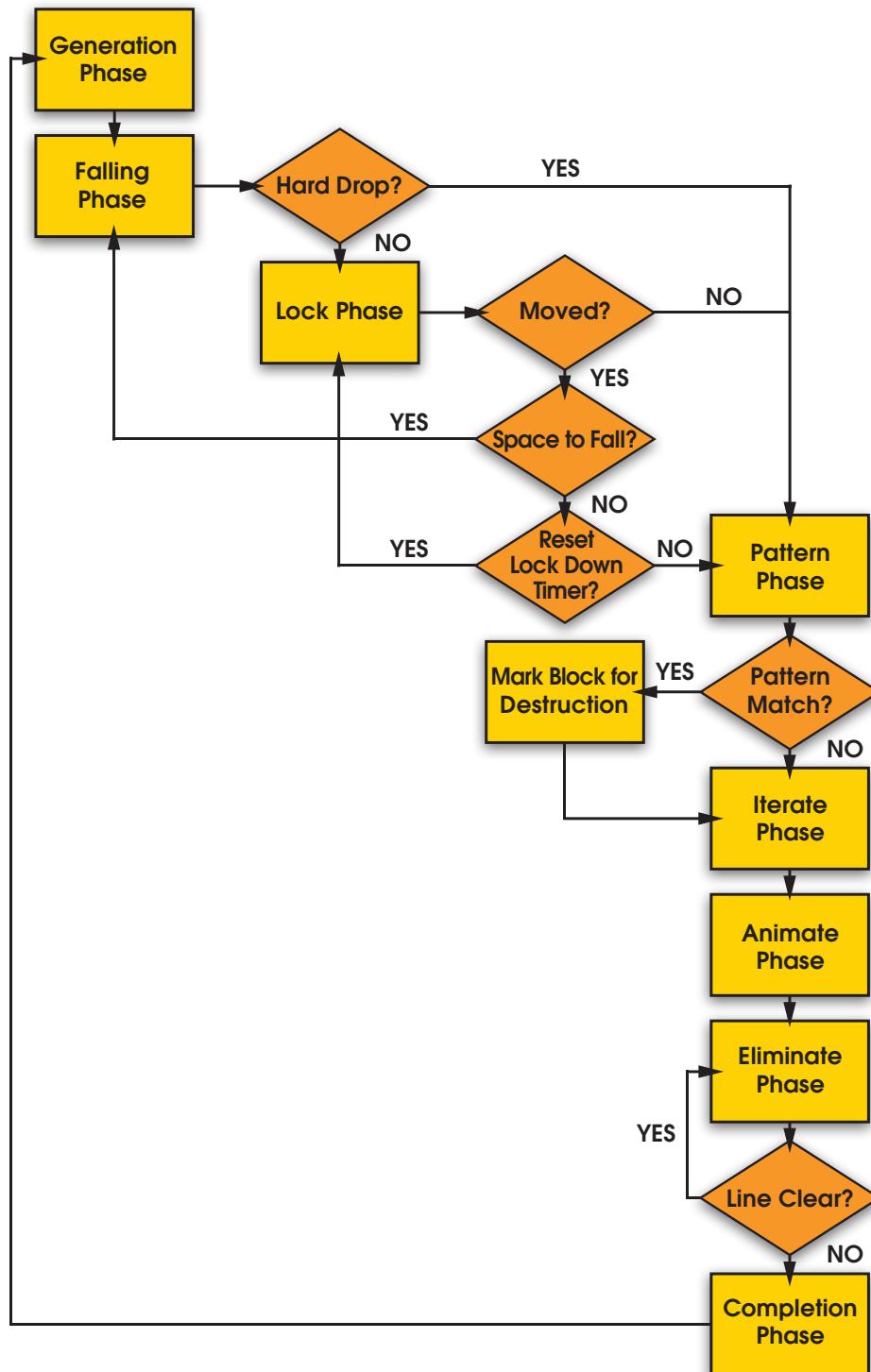
Other BGMs may be included for the player to select.



APPENDIX A THE TETRIS ENGINE

A1.1 TETRIS ENGINE FLOWCHART

Only one Tetrimino can be manipulated by the player at a time. In Tetris (not including variants), each Tetrimino that appears in the Matrix travels through eight phases in the Tetris Engine. In order, these phases are: Generation, Falling, Lock, Pattern, Iterate, Animate, Eliminate, and Completion.



Tetris® Design Guideline

March, 2009

A1.2 TETRIS PHASES

A1.2.1 Generation Phase

Random Generation

Tetris uses a “bag” system to determine the sequence of Tetriminos that appear during game play. This system allows for equal distribution among the seven Tetriminos.

The seven different Tetriminos are placed into a virtual bag, then shuffled into a random order. This order is the sequence that the bag “feeds” the Next Queue. Every time a new Tetrimino is generated and starts its fall within the Matrix, the Tetrimino at the front of the line in the bag is placed at the end of the Next Queue, pushing all Tetriminos in the Next Queue forward by one. The bag is refilled and reshuffled once it is empty.

Generation of Tetriminos

The generation time of a Tetrimino is 0.2 seconds after the Lock Down of the previous Tetrimino. This slight delay happens as soon as the Completion Phase is finished. Generation time may change depending on the handling of the target platform.

Starting Location and Orientation

The bottom left corner of a 10 cell wide by 20 cell high Matrix is considered the origin, with the first cell being at x-coordinate 1 and y-coordinate 1: (1, 1). The upper right cell of the Matrix is at (10, 20). Upon generation, the “center” Mino of the Tetrimino, i.e., Visual Rotation Point/Rotation Point #1 (see the **Super Rotation System** section in this appendix), occupies the cell with an x-coordinate of 5 and a y-coordinate of 21, which is in the first row above the Skyline.

Tetriminos are all generated North Facing (just as they appear in the Next Queue) on the 21st and 22nd rows, just above the Skyline. Every Tetrimino that is three Minos wide is generated on the 4th cell across (4, 21) and stretches to the 6th (6, 21). This includes the T-Tetrimino, L-Tetrimino, J-Tetrimino, S-Tetrimino and Z-Tetrimino. The I-Tetrimino and O-Tetrimino are exactly centered horizontally at generation. The I-Tetrimino is generated on the 21st row (*not* 22nd), stretching from the 4th to 7th cells (4, 21) - (7, 21), and the O-Tetrimino is generated on the 5th and 6th cell (5, 21) - (6, 21).

As soon as a Tetrimino is generated, three things *immediately* happen: 1) the Tetrimino drops one row if no existing Block is in its path, 2) the Tetrimino enters the Falling Phase where the player is able to move and rotate it, and 3) the Ghost Piece (if turned on) appears below, North Facing. If an existing Block is in the Tetrimino’s path, the Tetrimino does not drop one row immediately, however, a few pixels of the generated Tetrimino are shown (hardware permitting) to help the player manipulate it above the Skyline.

A1.2.2 Falling Phase

Throughout the Falling Phase, the player can move, rotate, Soft Drop, Hard Drop, and Hold a Tetrimino. The Tetrimino enters the Lock Phase once it lands on a Surface. For more information on Tetrimino Fall Speed, see the **Fall & Drop Speeds** section.

A1.2.3 Lock Phase

The player can perform the same actions on a Tetrimino in this phase as he/she can in the Falling Phase, as long as the Tetrimino is not yet Locked Down. A Tetrimino that is Hard Dropped Locks Down immediately. However, if a Tetrimino naturally falls or Soft Drops onto a landing Surface, it is given 0.5 seconds on a Lock Down Timer before it actually Locks Down.

Three rulesets—Infinite Placement, Extended, and Classic—dictate the conditions for Lock Down (see the **Tetrimino Manipulation** section).

Note: Using the Super Rotation System, rotating a Tetrimino often causes the y-coordinate of the Tetrimino to increase, i.e., it “lifts up” off the Surface it landed on. The Lock Down Timer does not reset in this case, but it does stop counting down until the Tetrimino lands again on a Surface that has the same (or higher) y-coordinate as it did before it was rotated. Only if it lands on a Surface with a lower y-coordinate will the timer reset.

If moving or rotating a Tetrimino causes it to fall again, it re-enters the Falling Phase. Once the Tetrimino is fully Locked Down, it enters the Pattern Phase.

A1.2.4 Pattern Phase

In this phase, the engine looks for patterns made from Locked Down Blocks in the Matrix. Once a pattern has been matched, it can trigger any number of Tetris variant-related effects.

The classic pattern is the Line Clear pattern. This pattern is matched when one or more rows of 10 horizontally aligned Matrix cells are occupied by Blocks. The matching Blocks are then marked for removal on a hit list. Blocks on the hit list are cleared from the Matrix at a later time in the Eliminate Phase.

This phase takes up no apparent game time.

A1.2.5 Iterate Phase

In this phase, the engine is given a chance to scan through all cells in the Matrix and evaluate or manipulate them according to an editor-defined iteration script. This phase consumes no apparent game time.

Note: This phase is included in the engine to allow for more complicated variants in the future, and has thus far not been used.

A1.2.6 Animate Phase

Here, any animation scripts are executed within the Matrix. The Tetris Engine moves on to the Eliminate Phase once all animation scripts have been run.

A1.2.7 Eliminate Phase

Any Minos marked for removal, i.e., on the hit list, are cleared from the Matrix in this phase. If this results in one or more complete 10-cell rows in the Matrix becoming unoccupied by Minos, then all Minos above that row(s) collapse, or fall by the number of complete rows cleared from the Matrix. Points are awarded to the player according to the Tetris Scoring System, as seen in the **Scoring** section.

Game Statistics

Statistics such as the number of Singles, Doubles, Triples, Tetris, and T-Spins can also be tracked in the Eliminate Phase. Ideally, some sort of High Score Table should record the player’s name, the highest level reached, his total score, and other statistics that can be tracked in this phase.

A1.2.8 Completion Phase

This is where any updates to information fields on the Tetris playfield are updated, such as the Score and Time. The Level Up condition is also checked to see if it is necessary to advance the game level.

Tetris® Design Guideline

March, 2009

Whether the player Levels Up or not, control flows back into the Generation Phase of the Next Tetrimino.

A1.3 TETRIMINO FACINGS

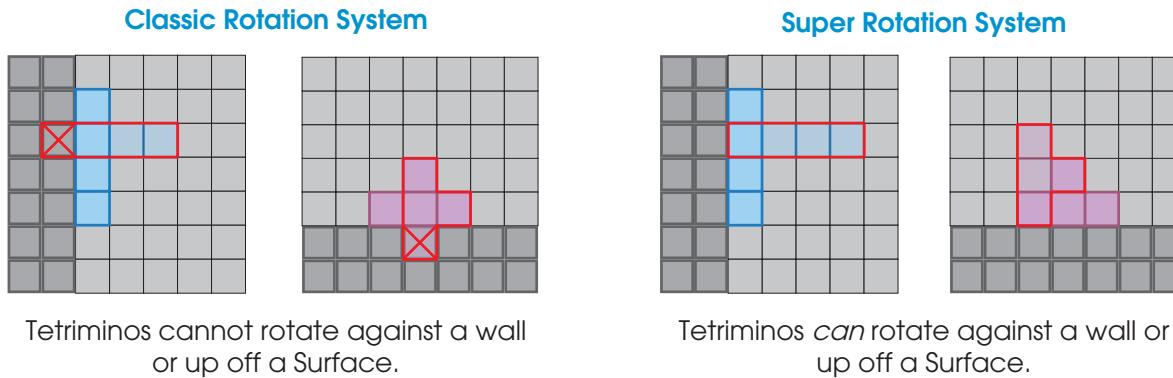
Each Tetrimino has a North, South, East, and West Facing. These facings are referred to extensively in the **Super Rotation System** section. Tetriminos are oriented in their North Facings when in the Next Queue, the Hold Queue, and when generated.

Tetrimino	North	East	South	West
O-Tetrimino				
I-Tetrimino				
T-Tetrimino				
L-Tetrimino				
J-Tetrimino				
S-Tetrimino				
Z-Tetrimino				

A1.4 SUPER ROTATION SYSTEM

The Super Rotation System is the expanded Tetrimino control that allows players greater flexibility and freedom of movement. Tetris products in the past used a simple means of rotation, which caused strict limitations as to where Tetriminos could and could not be rotated.

For instance, if the I-Tetrimino was against a wall, and the player attempted to rotate it, the Tetrimino would not rotate because the resulting rotation would cause the Tetrimino to collide with the wall. If a Tetrimino with a flat bottom edge (e.g., the T-Tetrimino) landed on a flat surface or floor, it also could not be rotated. The Super Rotation System allows Tetrimino rotation in such cases.



The Super Rotation System allows players to rotate the Tetriminos in other situations where they were previously disallowed using Classic Rotation. The system prioritizes possible rotations using five rotation points for each Tetrimino. If a Tetrimino cannot be rotated into the first position, the game checks a second position by using the second rotation point. If the Tetrimino can be rotated into the second position, it will do so. Otherwise, it tries the third rotation point, and possibly a fourth and a fifth. Whichever rotation succeeds first is used; if all five rotations fail, the rotation cannot occur in that situation.

The system is designed to be as intuitive as possible to the player. If the player presses rotate, the most intuitive, visual rotation is always used as long as no collision occurs. Subsequent rotations are less visually intuitive, but still rotate the Tetrimino as close as possible to a Tetrimino's "natural" visual center of rotation.

A1.4.1 Objectives

- Provide a New Standard: Establish a new standard of rotation to be used for all future Tetris products.
- Be Lenient: Allow the player to rotate a Tetrimino when it is against a wall, on the floor in a "Well", or in other situations where Tetriminos could not rotate in older Tetris games. This results in a less frustrating and more enjoyable game.
- Make Rotations Predictable: Make the system of rotations intuitive so that the player can easily predict the behavior of a Tetrimino when a button is pressed.
- Preserve Backwards Compatibility to Older Tetris Products: Allow the Tetrimino to rotate as it does in previous Tetris games.

A1.4.2 Super Rotation Diagrams

Each Tetrimino has five possible rotation points. If the Tetrimino cannot rotate on the first point, it will try to rotate on the second. If it cannot rotate on the second, it will try the third and so on. If it cannot rotate on any of the points, then it cannot rotate.

Tetris® Design Guideline

March, 2009

Specific Purposes for Each Rotation Point

There are six general situations that the rotation points were designed for:

- A.** **Visual:** The first point of rotation is the visual center of the Tetrimino. This is where a player would expect a Tetrimino to rotate, and is the point of rotation used in most past Tetris products. If there is nothing obstructing the resulting Tetrimino position, the Tetrimino will rotate using this point.
- B.** **Off the RIGHT Wall:** Point 2 for all 3x2 Tetriminos and points 2 & 3 for the I-Tetrimino are designed to help rotation in situations where there is an obstruction at the side of a Tetrimino. It shifts the Tetrimino away from the obstruction, and then rotates the Tetrimino.
- C.** **Off the LEFT Wall:** same as **B**.
- D.** **Off the FLOOR:** Point 3 for 3x2 Tetriminos and points 4 & 5 for the I-Tetrimino allow rotation where there is an obstruction below the Tetrimino by shifting it up and then rotating it.
- E.** **Out of a RIGHT Well:** A vertical depression at the top of the “garbage” into which a Tetrimino can fall is called a Well. Super Rotation points 4 & 5 allow players to effectively rotate out of a Well.
- F.** **Out of a LEFT Well:** same as **E**.

Depending on the position of a Tetrimino, the different rotation points will achieve the above purposes. These purposes are shown on the 5th and 6th (and 7th & 8th for the I-Tetrimino) pages of each Tetrimino’s set of pages. For example, for the S-Tetrimino, Point 2’s general purpose is rotation off walls. Using Point 2 in the East position, the S-Tetrimino will rotate off the Left wall if rotated in either direction. To see how the engine works, first try the S-Tetrimino’s Point 1 for the East start position. Imagine that there is a wall lined up on the left side of the Tetrimino. Both the left and right rotations will cause a collision into this wall. Thus, the engine then chooses Point 2. Because this rotation point results in shifting the Tetrimino over to the right, this point will succeed in rotating the S-Tetrimino Off the Wall, and the engine selects Point 2.

To summarize,

Point 1 is just the Visual Rotation, for all Start Positions, and for all Tetriminos (**A**).

3x2 T-, L-, J-, S-, Z-Tetriminos

Point 2 is designed for Off the Right/Left Wall rotations (**B, C**).

Point 3 is for Off the Floor rotations (**D**).

Point 4 is for rotation Out of a Right/Left Well, depending on the start position (**E, F**).

Point 5 is the reverse of Point 4. It rotates Out of a Right/Left Well, depending on the start position (**E, F**).

4x1 I-Tetrimino

Point 2 is for Off the Right/Left Wall rotations (**B, C**).

Point 3 is the reverse of Point 2. It is for Off the Right/Left Wall rotations (**B, C**).

Point 4 is for Off the Floor rotations, and for rotation Out of a Right/Left Well (**D, E, F**).

Point 5 is the reverse of Point 4. It is for Off the Floor rotations, and for rotation Out of a Right or Left Well (**D, E, F**).

2x2 "O" Tetrimino

All rotation points for all start positions are the same. Thus, all rotations for this Tetrimino are Visual Rotations (**A**).

How to View the Super Rotation Diagrams

The following diagrams show single rotations in both the right (clockwise) and left (counterclockwise) directions for all seven Tetriminos in four possible start positions, using the five possible Super Rotation points. The O-Tetrimino will only ever rotate using its 1st rotation point. Since it has the same rotation points for all start positions, the diagrams for North, East, South and West starting orientations are combined into a single page.

Each page shows rotations using the five different rotation points. There are six pages for the 3x2 Tetriminos, and eight for the I-Tetrimino. The first page has the Tetrimino starting in its North Facing orientation, the next has it in its East Facing, then the South, and then the West. The last pages display the Primary Rotations, which are designed for situations such as Off the Wall, Off the Floor, and Out of a Well (see section on **Specific Purposes for Each Rotation Point**).

Each Tetrimino is oriented somewhere inside a white box outlined in gray. The position of the white box remains constant so that it can be used to visualize the movement of the Tetrimino. The gray outline is the Tetrimino's "Visual Rotation Bounding Box". The Tetrimino will never jump outside the gray.

The middle column of diagrams is the starting position of a Tetrimino. The left column of diagrams is the resulting position of rotating a Tetrimino left, or counterclockwise. The right column is the resulting position of rotating a Tetrimino right, or clockwise.

The first row of diagrams should be used as a reference for each of the rotation points. The rotation points chosen for a particular situation is the first one of the five that works; Point 1 is the first point tried, and Point 5 is the last point tried.

Certain rotation points are designed to have specific purposes. The Primary Rotation pages illustrate the situations for which these points are meant. The red areas designate obstructions such as walls, the floor, or other Tetriminos. The labels **A** through **F** next to various points on the first four pages refer to that point's corresponding Primary Rotation diagram on the last pages.

How to Use the Rotation Points

In the process of choosing which rotation point to use, the engine first tries Point 1 of the Tetrimino in the **middle column, top row** of each page. Call this point Start-1. It then looks at Point 1 of the Tetrimino in the **right or left column** (depending on the rotation direction), **top row** of the same page. Call this point End-1. It will attempt the rotation by shifting the right/left column, top row Tetrimino so that End-1 matches up with Start-1. If the resulting Tetrimino collides with any other Blocks/walls/floor, this Point 1 rotation fails, and the engine tries Point 2.

Super Rotation Example:

Look at the S-Tetrimino, East Facing, Point 3 rotation. The start position is East, and the top row of the page shows all the rotation points for this position. Using the Left rotation for Point 3:

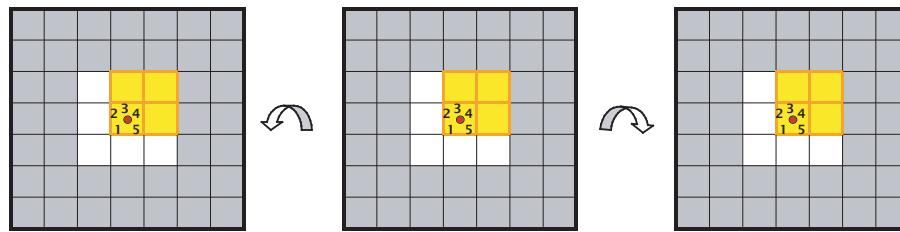
1. Start-3 is Point 3 of the East Facing Tetrimino in the top row.
2. End-3 is Point 3 of the North Facing Tetrimino in the top row.
3. Shift the North Facing Tetrimino in the top row so that End-3 matches up with Start-3.
4. Check if the resulting Tetrimino collides with anything. If not, use this rotation. If it does, then try Point 4.

Tetris® Design Guideline

March, 2009

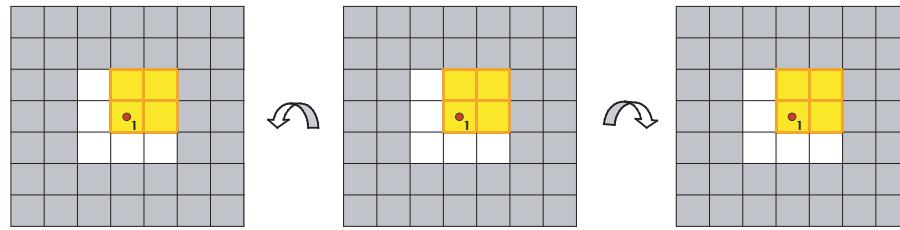
'O' TETRIMINO: LEFT & RIGHT ROTATION, ALL START POSITIONS

Note: All rotation points for the 'O' Tetrimino are the same for all start positions.

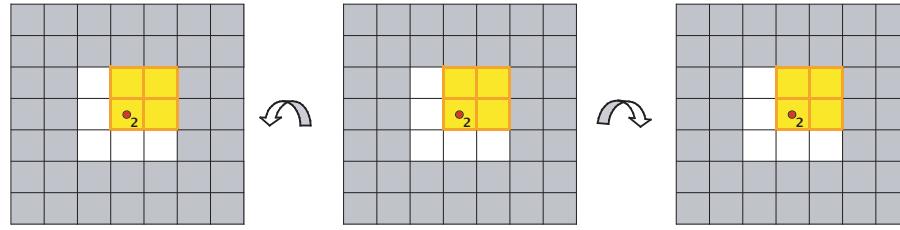


POINT 1:

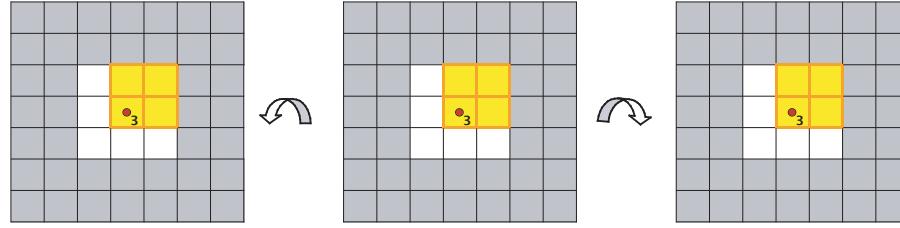
A. VISUAL



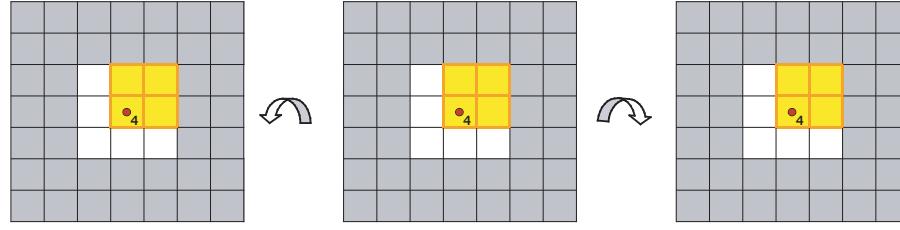
POINT 2:



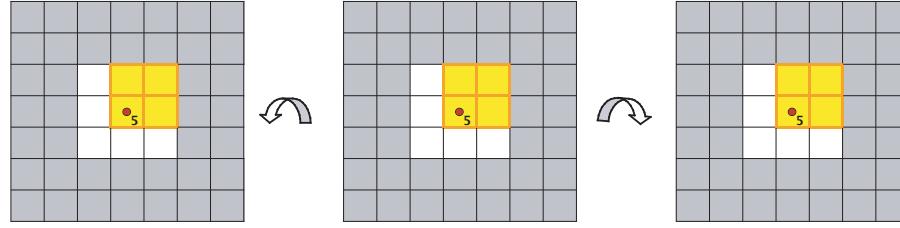
POINT 3:



POINT 4:

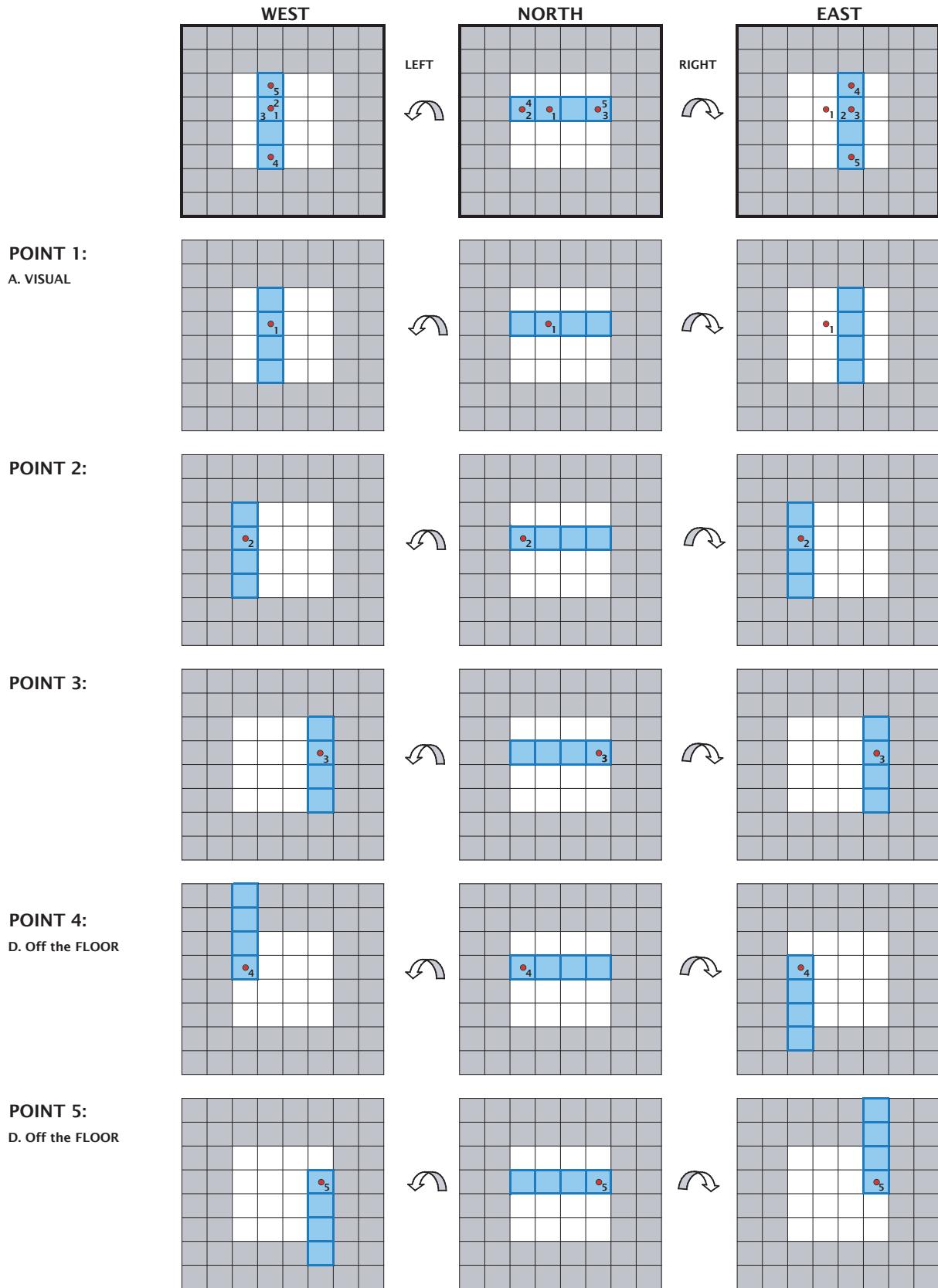


POINT 5:



APPENDIX A THE TETRIS ENGINE

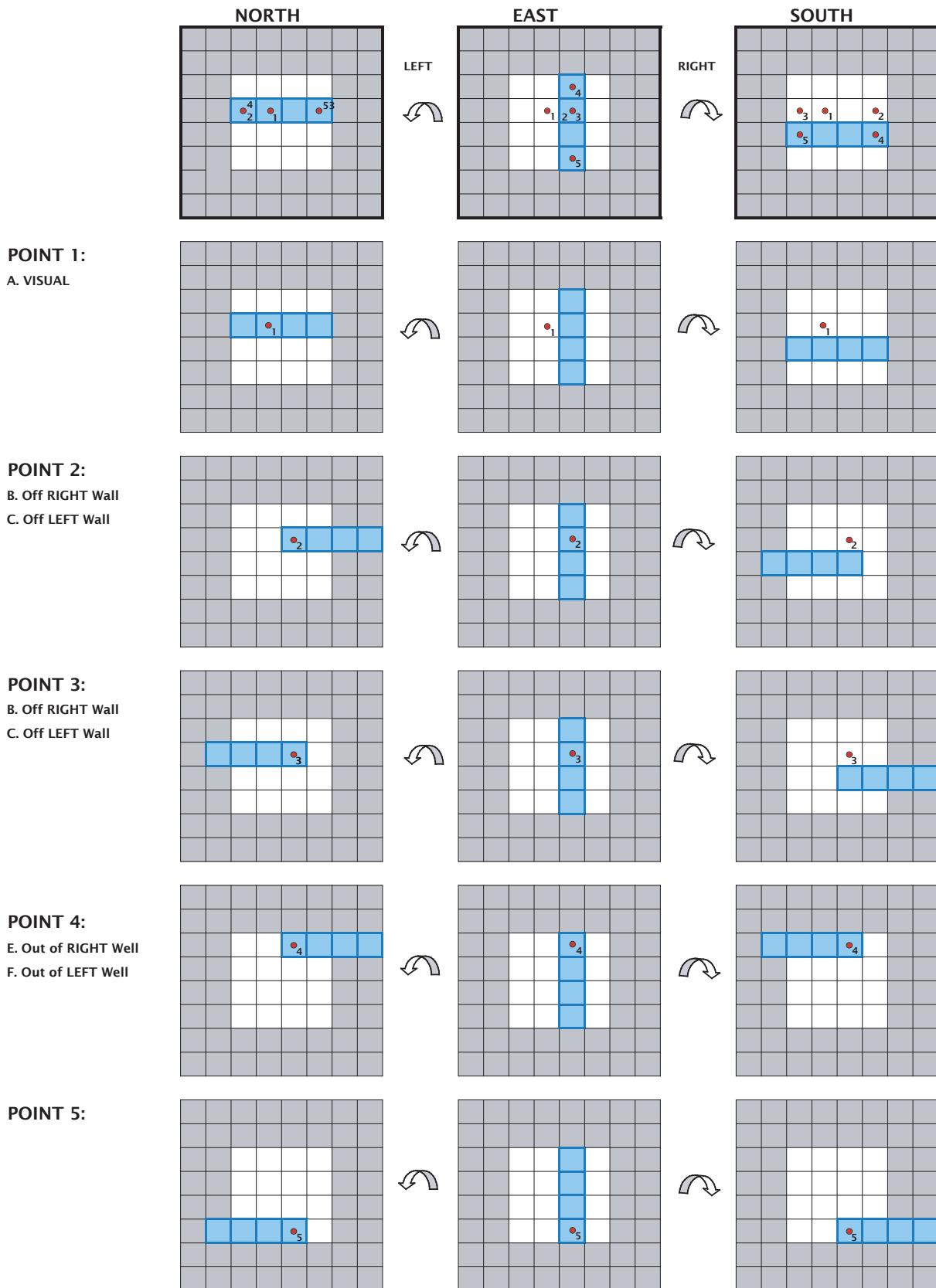
'I' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = NORTH



Tetris® Design Guideline

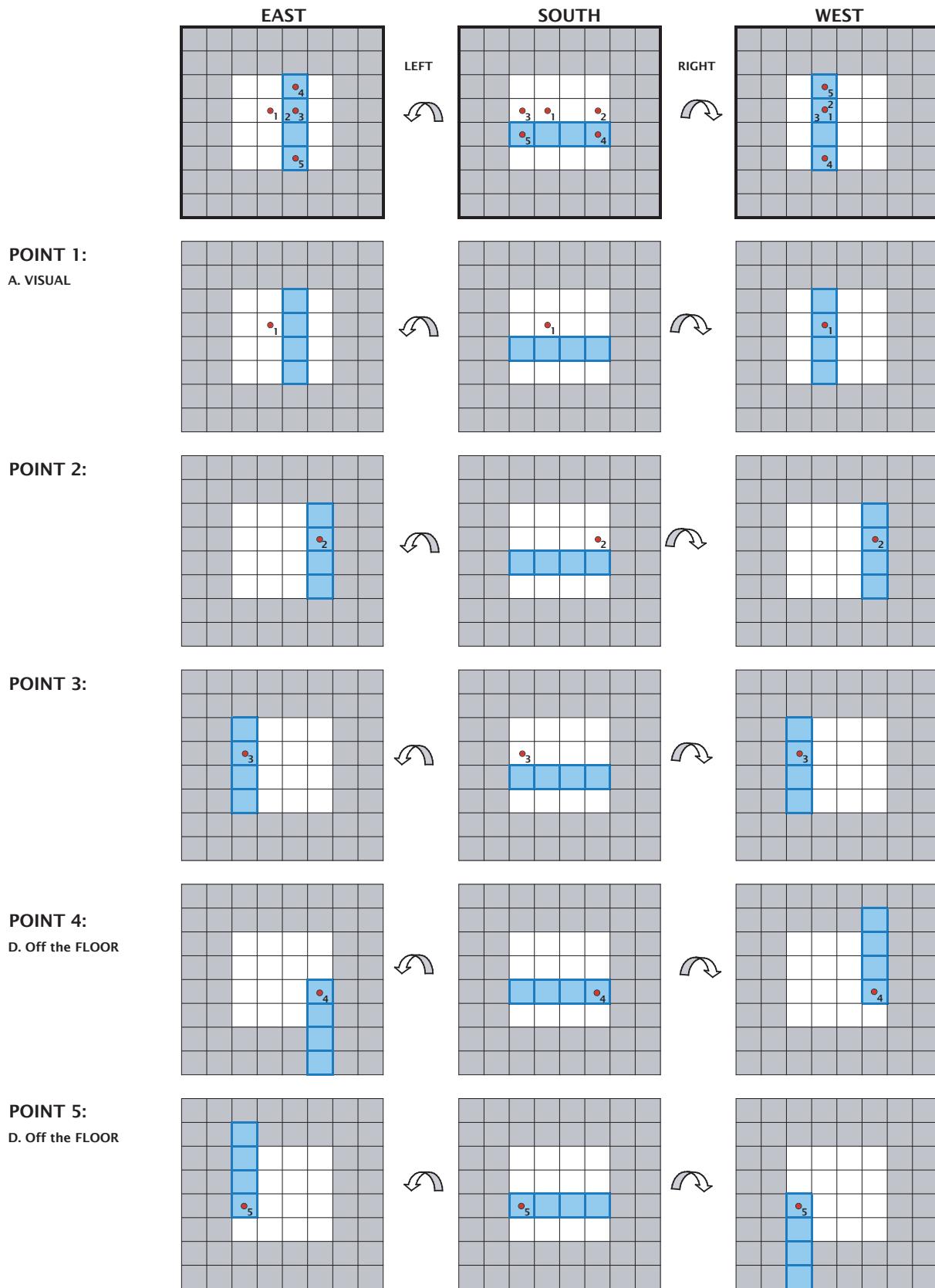
March, 2009

'I' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = EAST



APPENDIX A THE TETRIS ENGINE

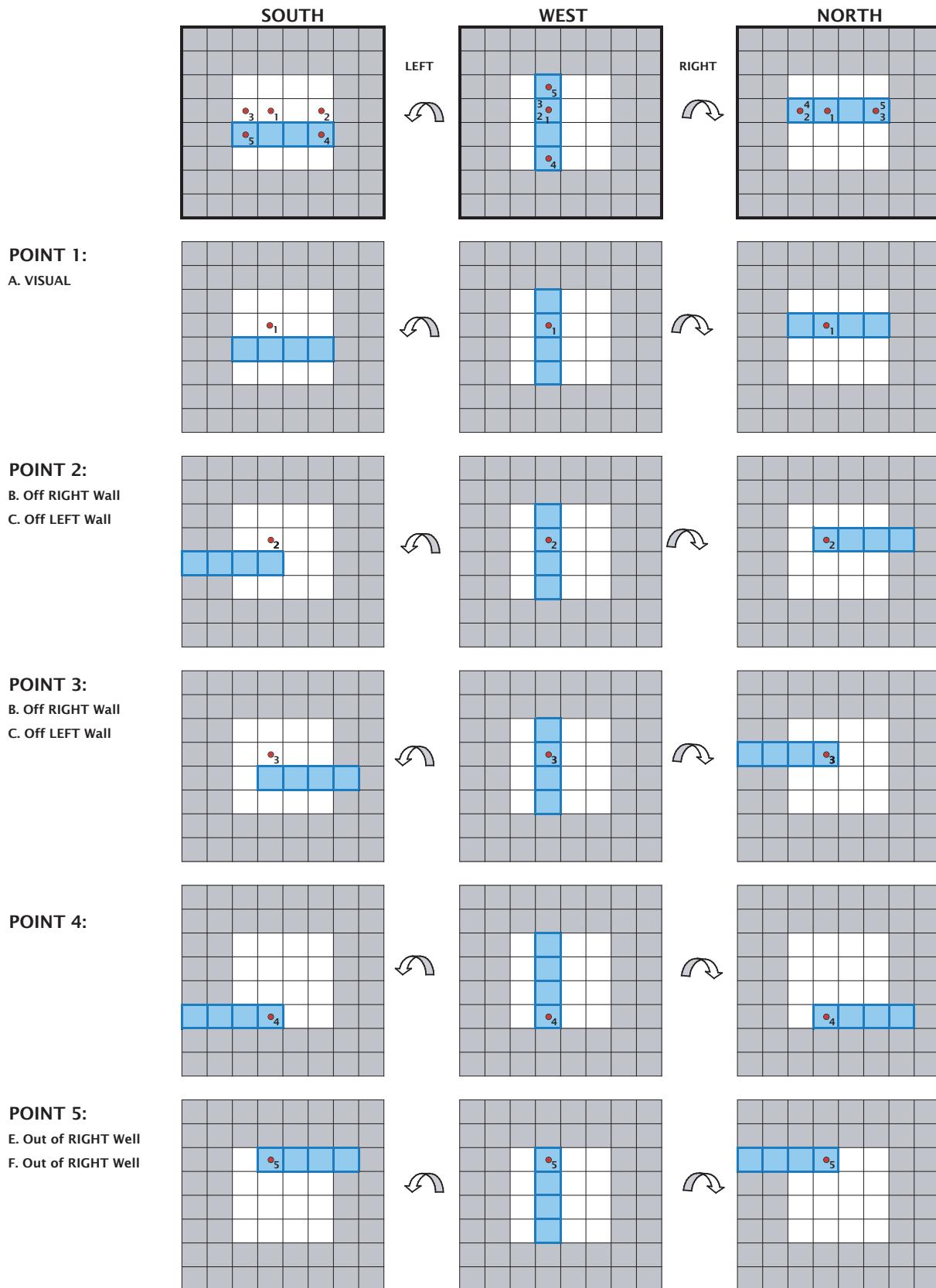
'I' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = SOUTH



Tetris® Design Guideline

March, 2009

'I' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = WEST

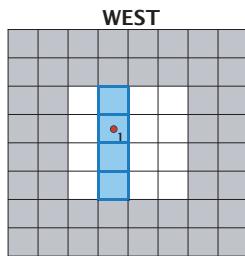


APPENDIX A THE TETRIS ENGINE

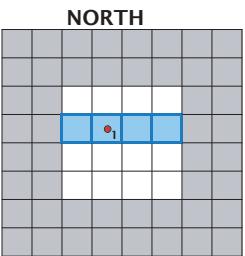
PRIMARY ROTATIONS

A. VISUAL

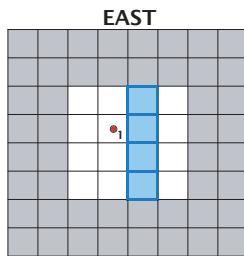
POINT 1:



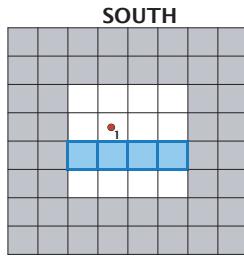
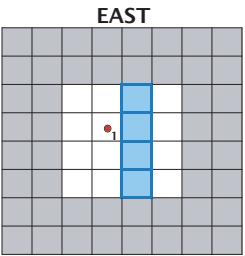
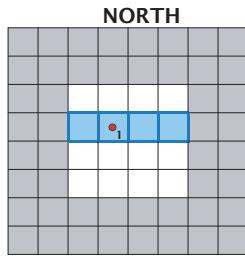
LEFT



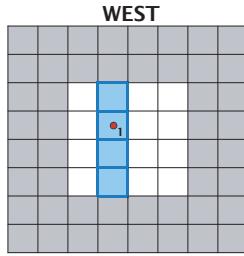
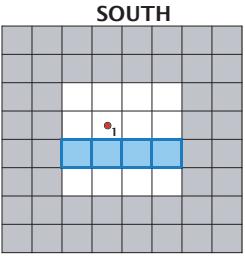
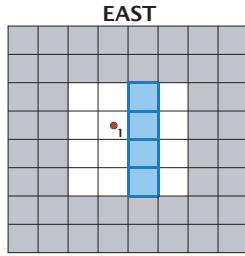
RIGHT



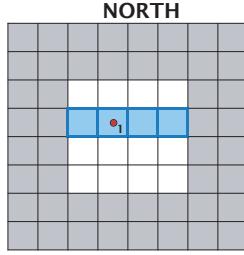
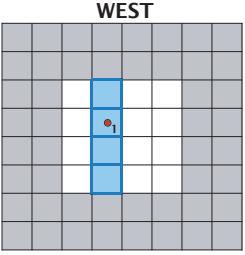
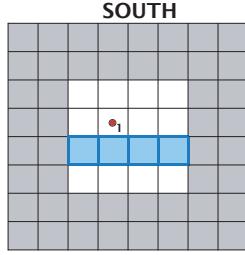
POINT 1:



POINT 1:

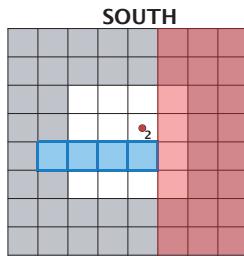
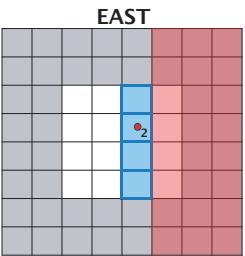


POINT 1:

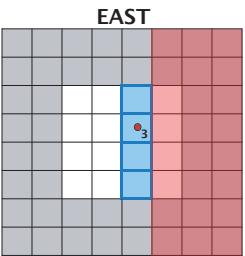
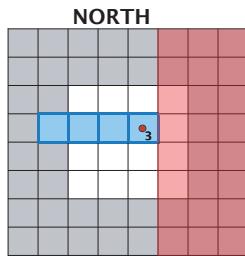


B. Off the RIGHT Wall

POINT 2:



POINT 3:



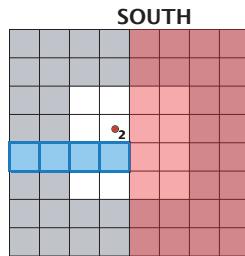
Tetris® Design Guideline

March, 2009

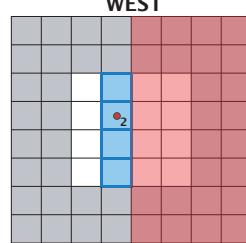
PRIMARY ROTATIONS (cont'd)

B. Off RIGHT Wall

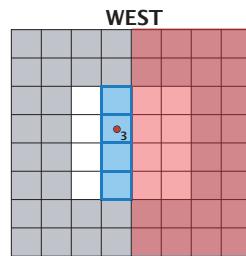
POINT 2:



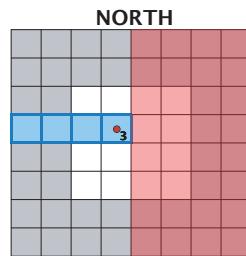
WEST



POINT 3:

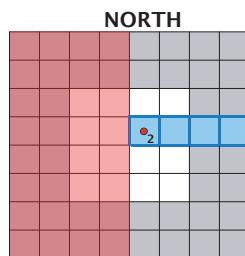


NORTH

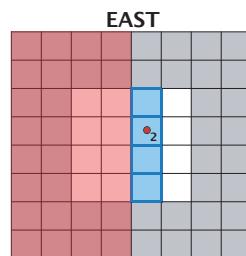


C. Off LEFT Wall

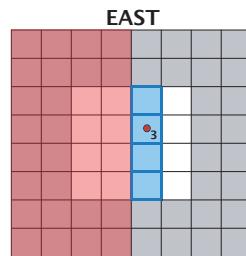
POINT 2:



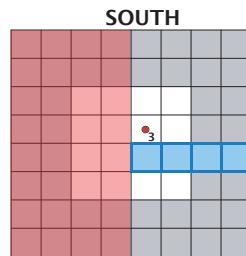
EAST



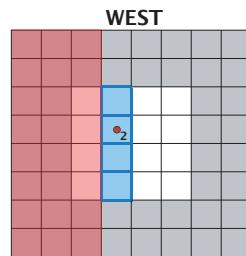
POINT 3:



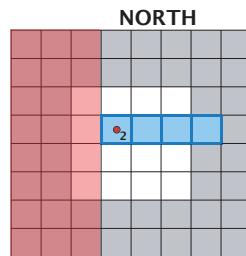
SOUTH



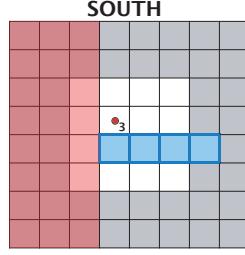
POINT 2:



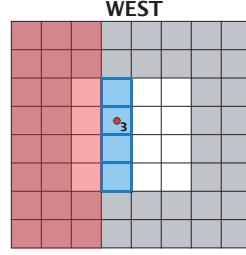
NORTH



POINT 3:



WEST

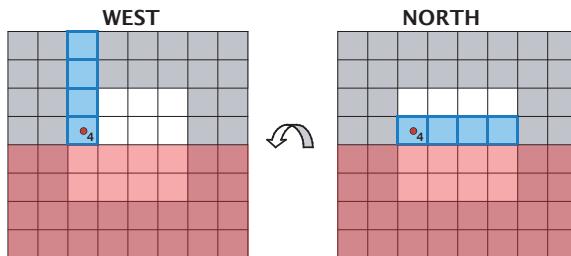


APPENDIX A THE TETRIS ENGINE

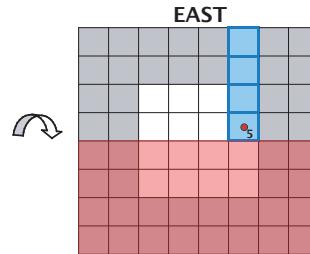
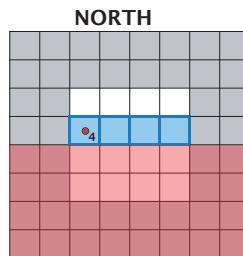
PRIMARY ROTATIONS (cont'd)

D. Off the FLOOR

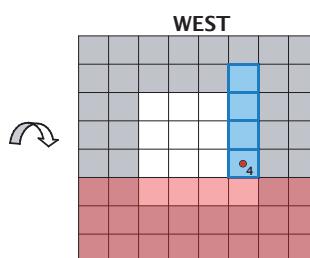
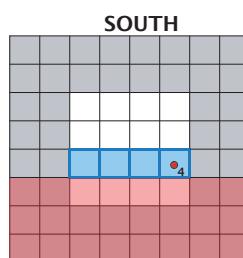
POINT 4:



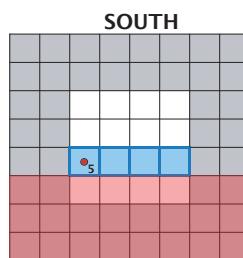
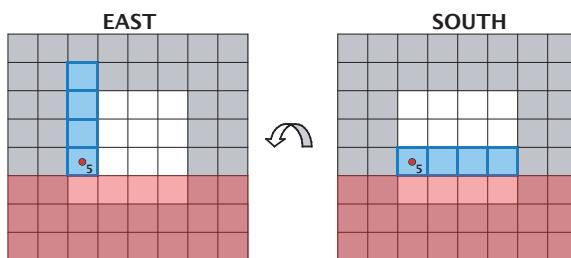
POINT 5:



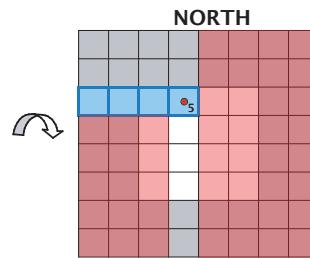
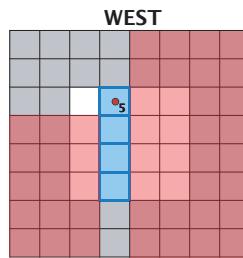
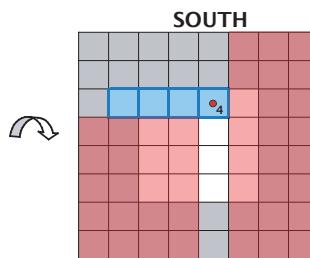
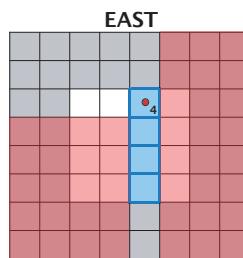
POINT 4:



POINT 5:



E. Out of RIGHT Well



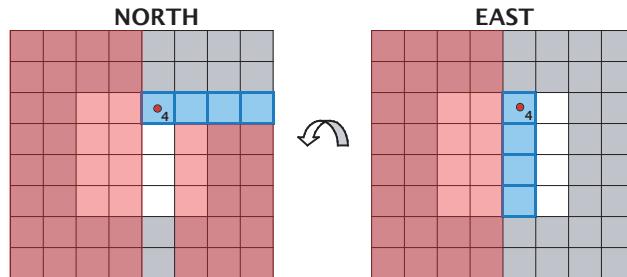
Tetris® Design Guideline

March, 2009

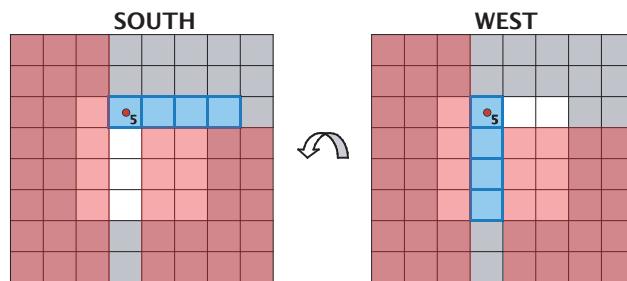
PRIMARY ROTATIONS (cont'd)

F. Out of LEFT Well

POINT 4:

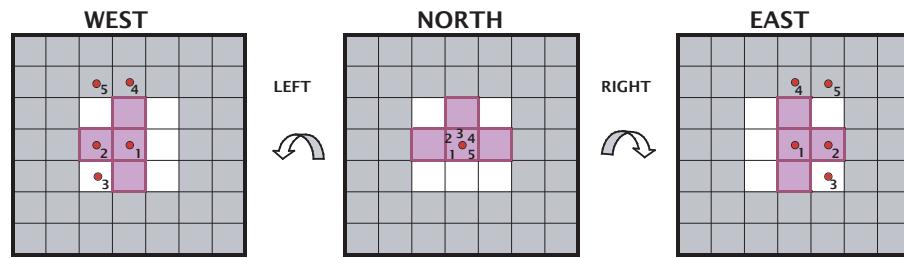


POINT 5:



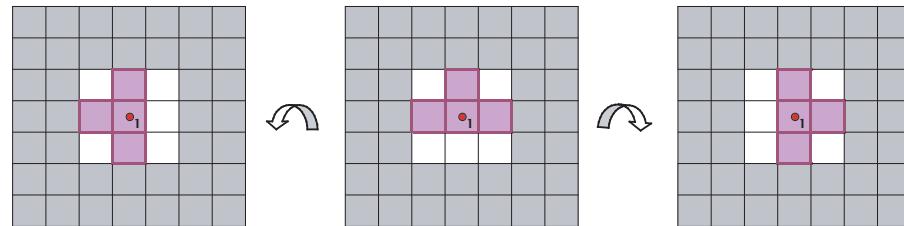
APPENDIX A THE TETRIS ENGINE

'T' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = NORTH

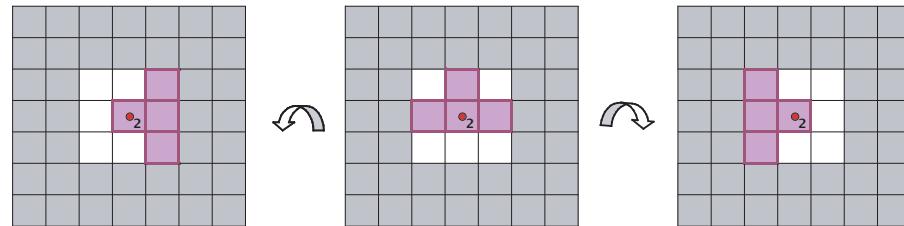


POINT 1:

A. VISUAL

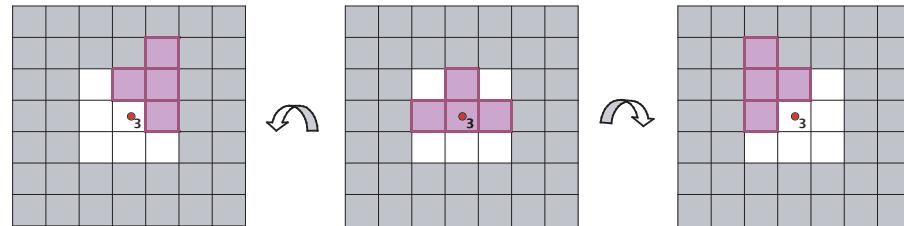


POINT 2:



POINT 3:

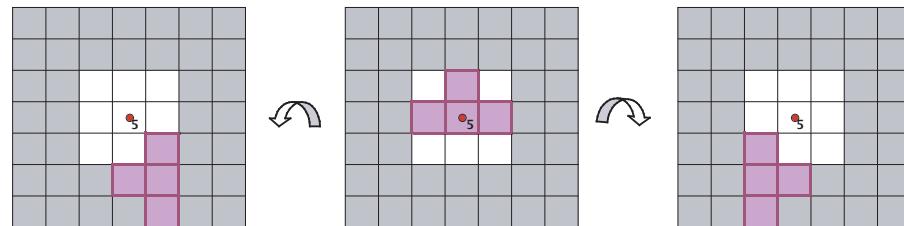
D. Off the FLOOR



POINT 4:

Not Used

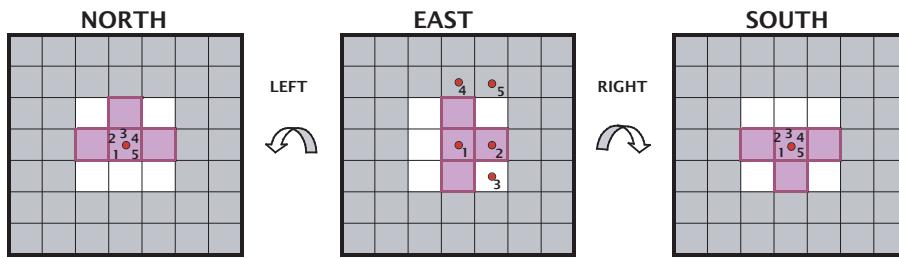
POINT 5:



Tetris® Design Guideline

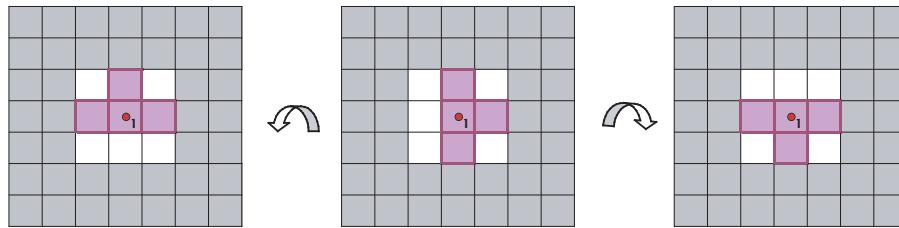
March, 2009

'T' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = EAST



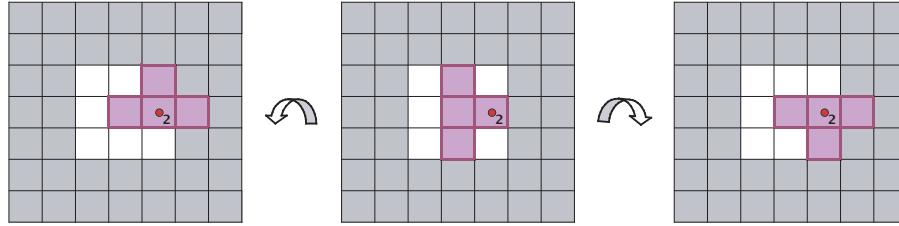
POINT 1:

A. VISUAL

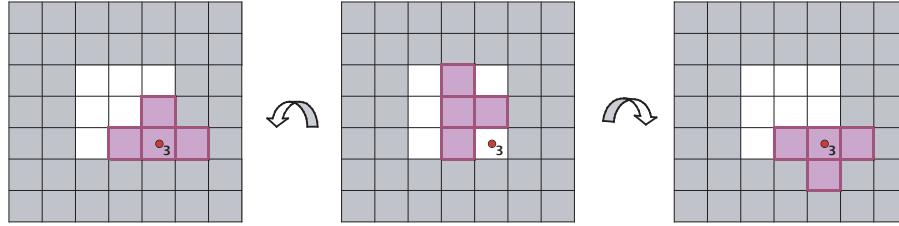


POINT 2:

C. Off the LEFT Wall

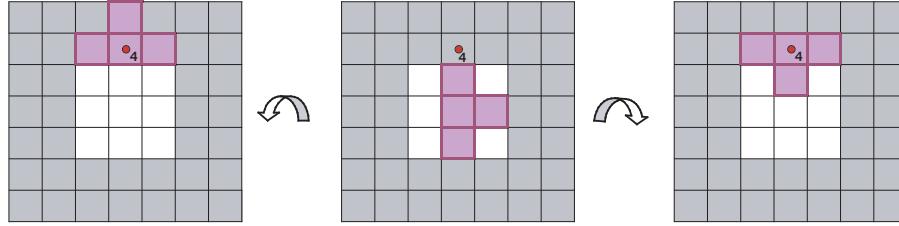


POINT 3:



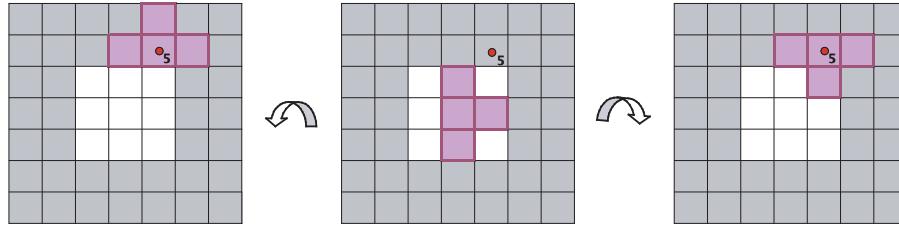
POINT 4:

E. Out of RIGHT Well



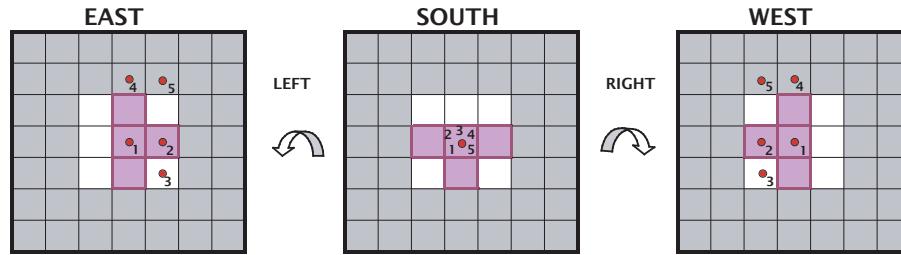
POINT 5:

F. Out of LEFT Well



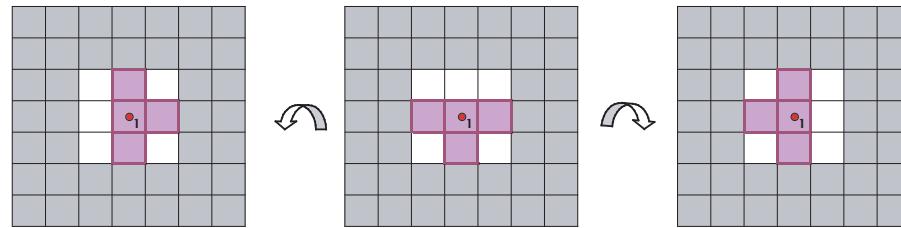
APPENDIX A THE TETRIS ENGINE

'T' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = SOUTH

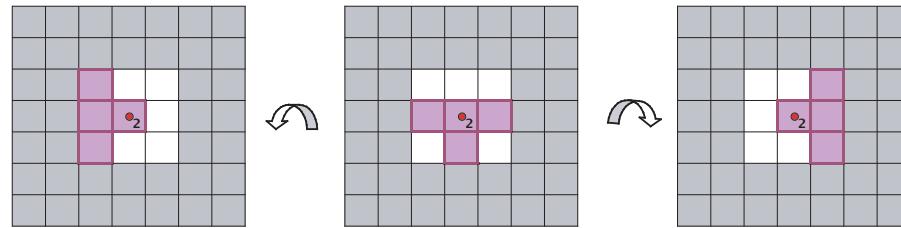


POINT 1:

A. VISUAL



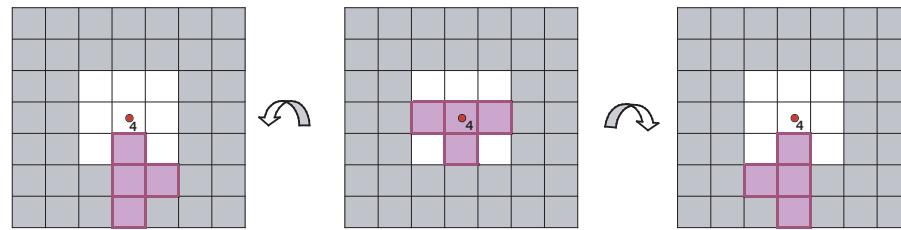
POINT 2:



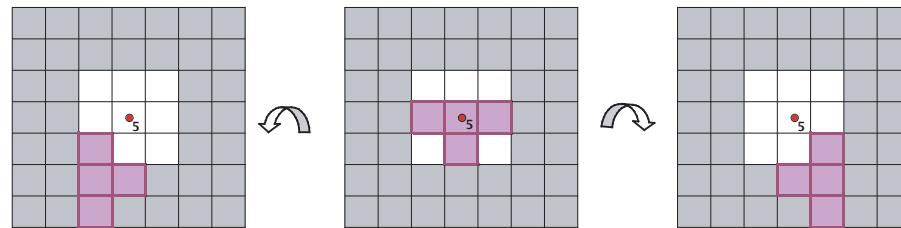
POINT 3:

Not Used

POINT 4:



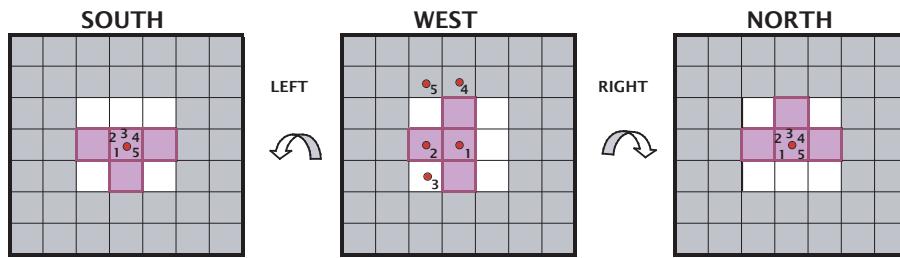
POINT 5:



Tetris® Design Guideline

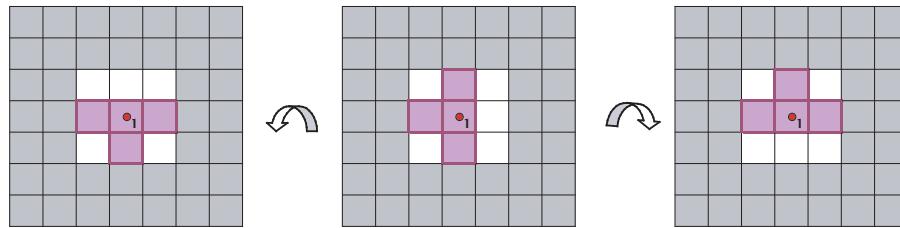
March, 2009

'T' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = WEST



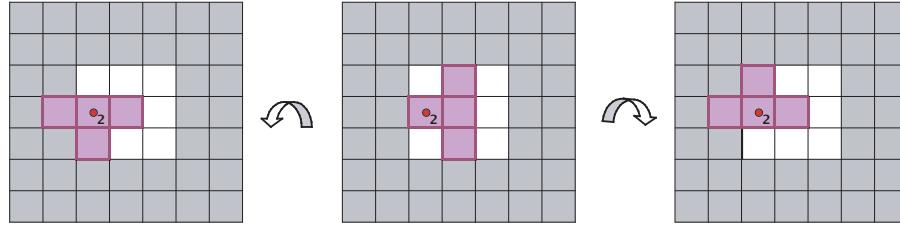
POINT 1:

A. VISUAL

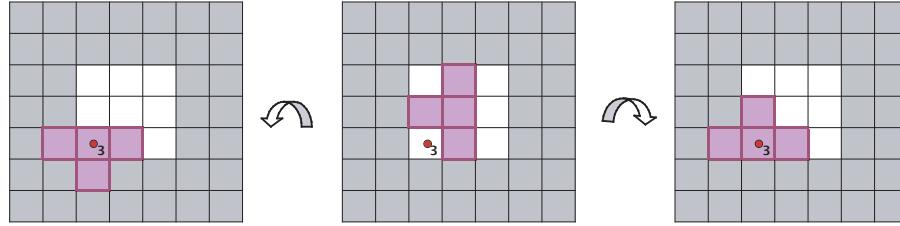


POINT 2:

B. Off the RIGHT Wall

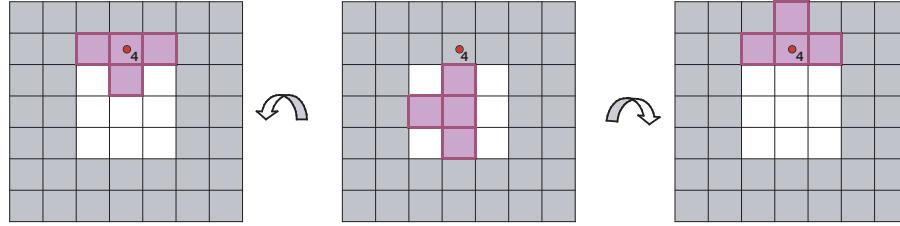


POINT 3:



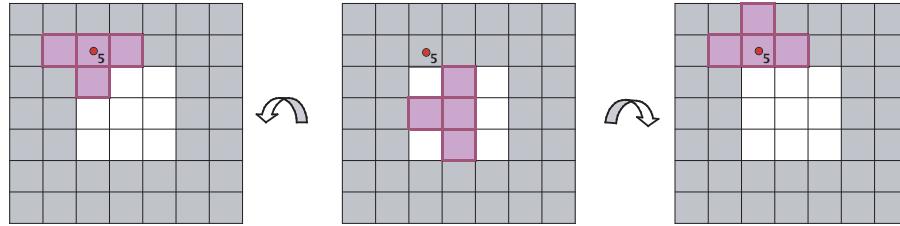
POINT 4:

F. Out of LEFT Well



POINT 5:

E. Out of RIGHT Well

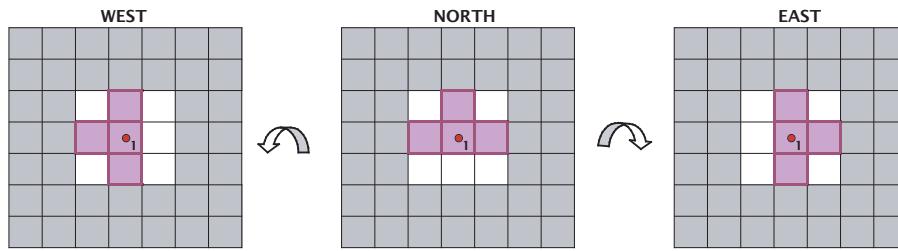


APPENDIX A THE TETRIS ENGINE

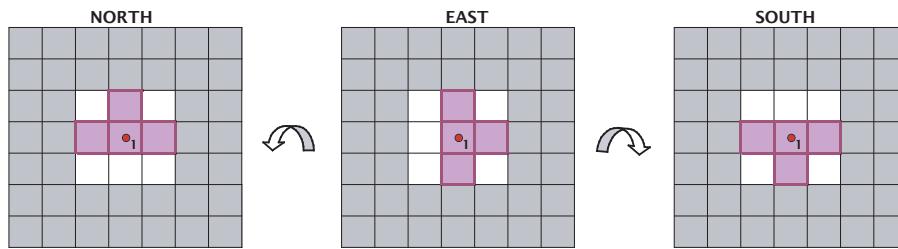
PRIMARY ROTATIONS

A. VISUAL

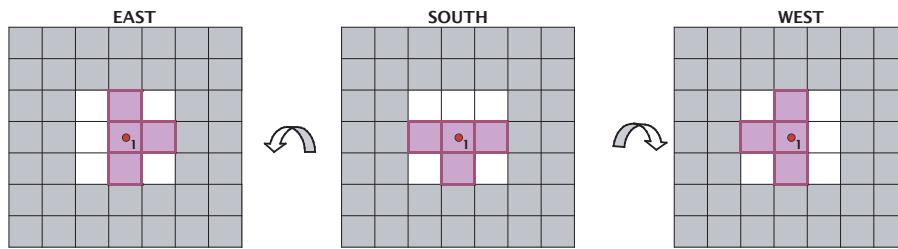
POINT 1:



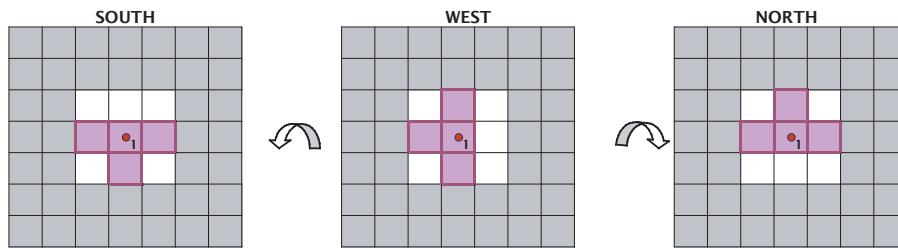
POINT 1:



POINT 1:

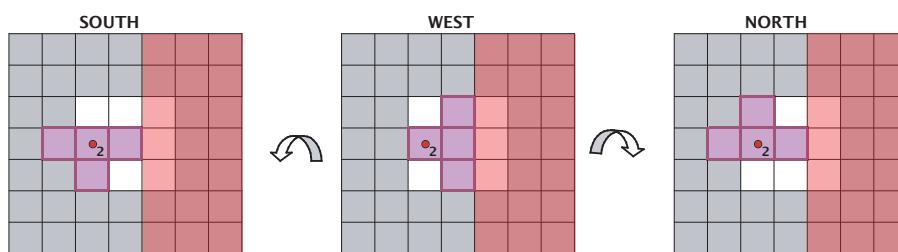


POINT 1:



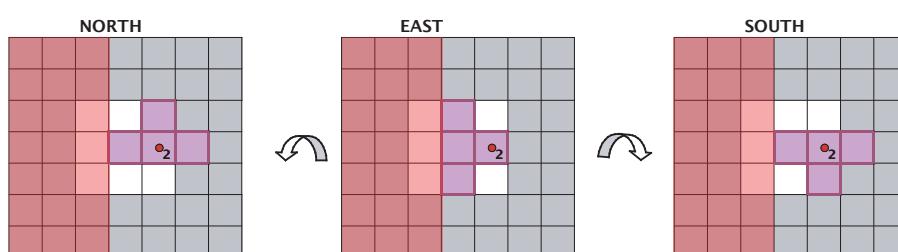
B. Off RIGHT Wall

POINT 2:



C. Off LEFT Wall

POINT 2:



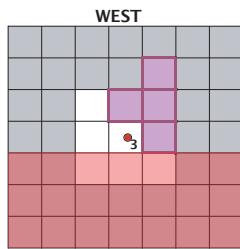
Tetris® Design Guideline

March, 2009

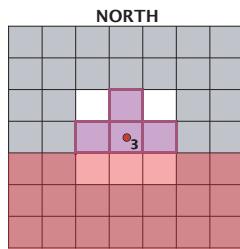
PRIMARY ROTATIONS (cont'd)

D. Off the FLOOR

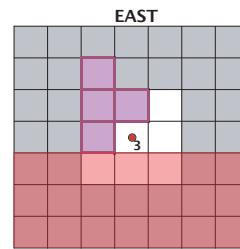
POINT 3:



LEFT

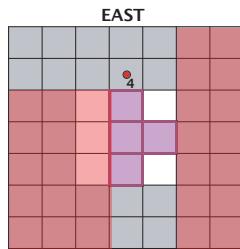
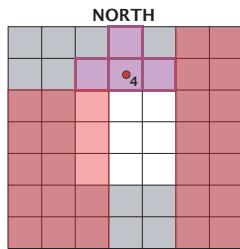


RIGHT

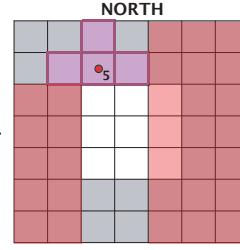
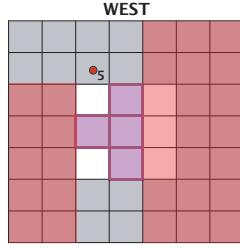


E. Out of RIGHT Well

POINT 4:

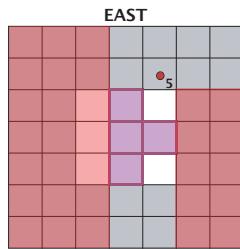
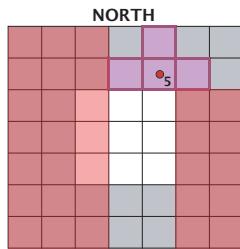


POINT 5:

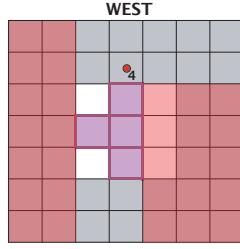


F. Out of LEFT Well

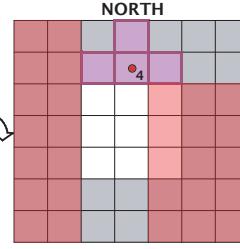
POINT 5:



POINT 4:

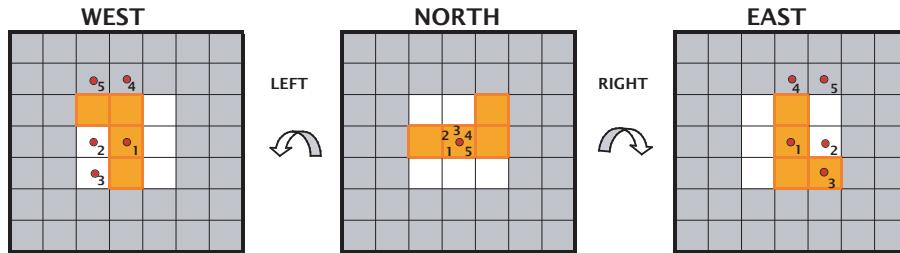


1



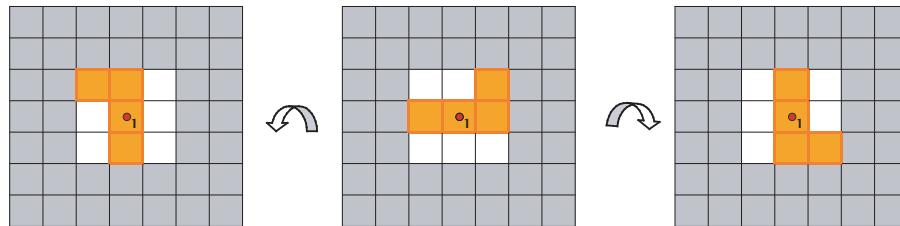
APPENDIX A THE TETRIS ENGINE

'L' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = NORTH

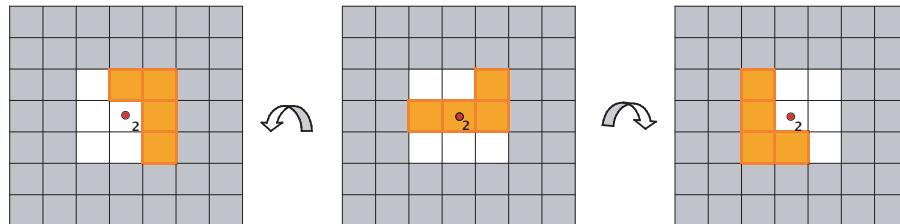


POINT 1:

A. VISUAL

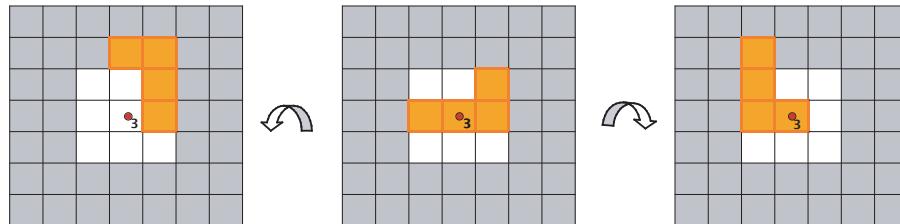


POINT 2:

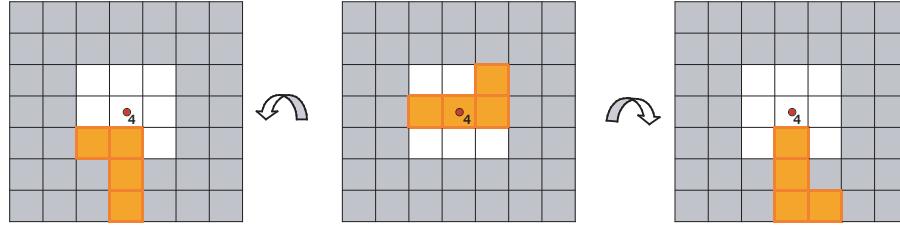


POINT 3:

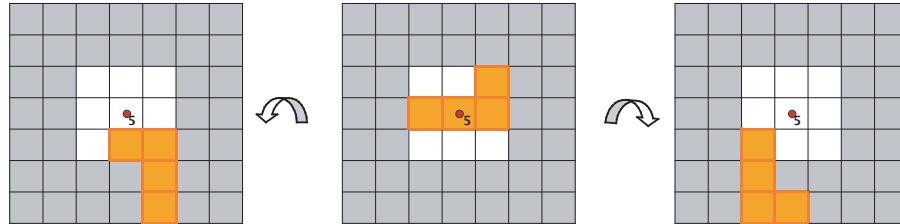
D. Off the FLOOR



POINT 4:



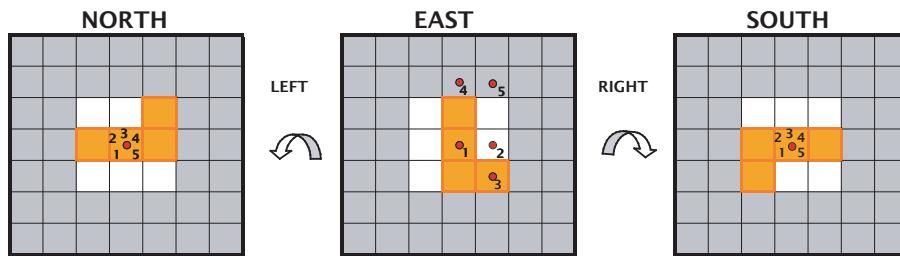
POINT 5:



Tetris® Design Guideline

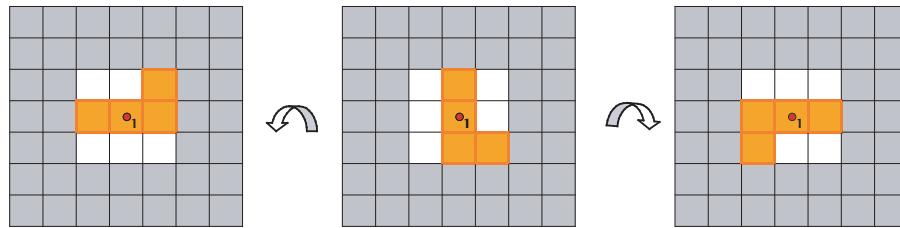
March, 2009

'L' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = EAST



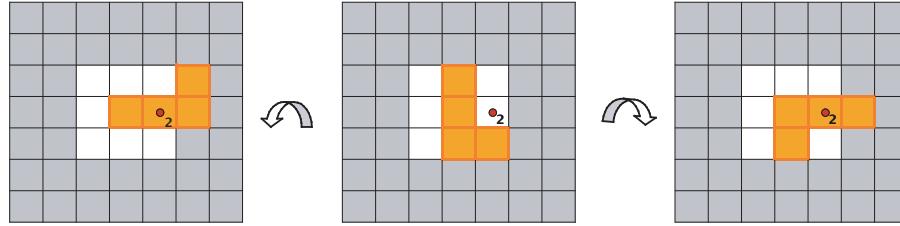
POINT 1:

A. VISUAL

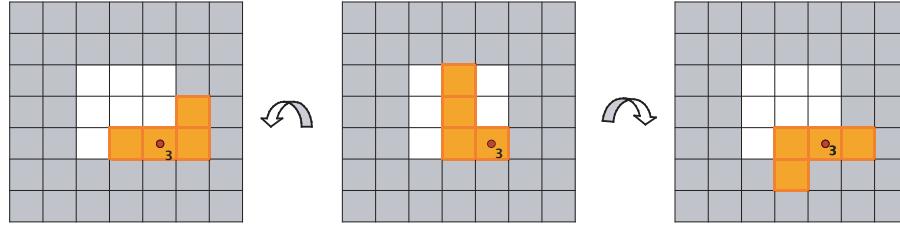


POINT 2:

C. Off the LEFT Wall

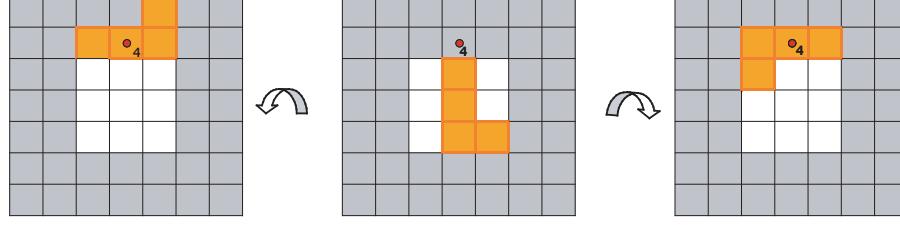


POINT 3:



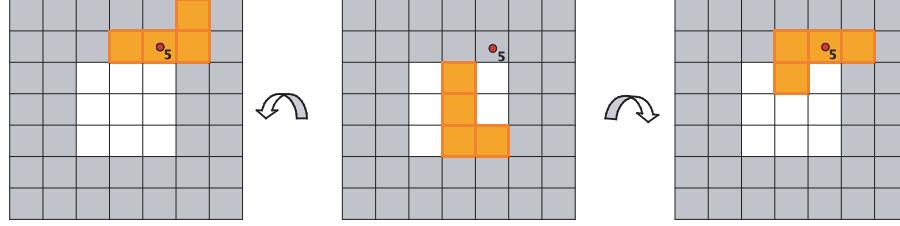
POINT 4:

E. Out of RIGHT Well



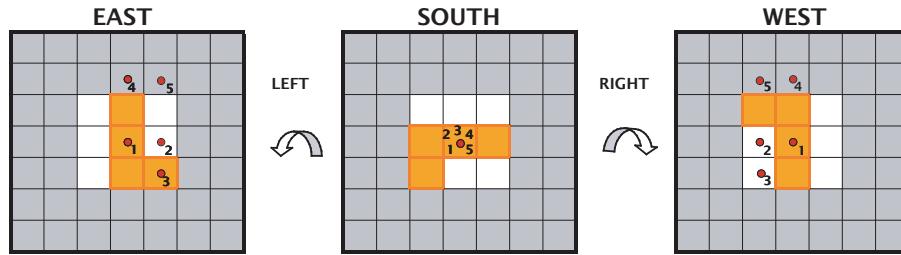
POINT 5:

F. Out of LEFT Well



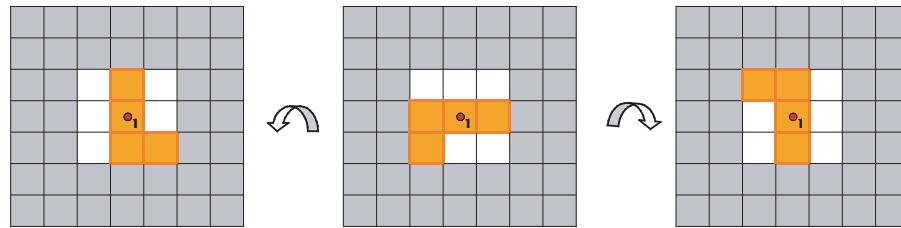
APPENDIX A THE TETRIS ENGINE

'L' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = SOUTH

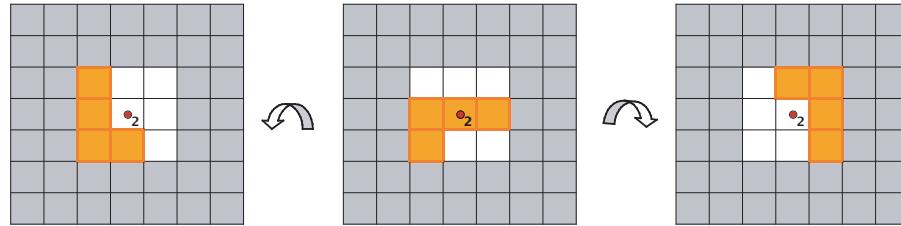


POINT 1:

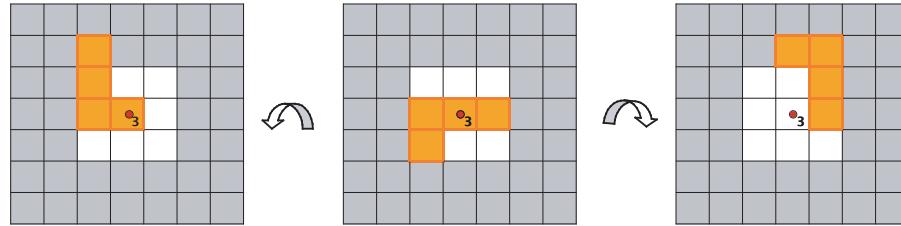
A. VISUAL



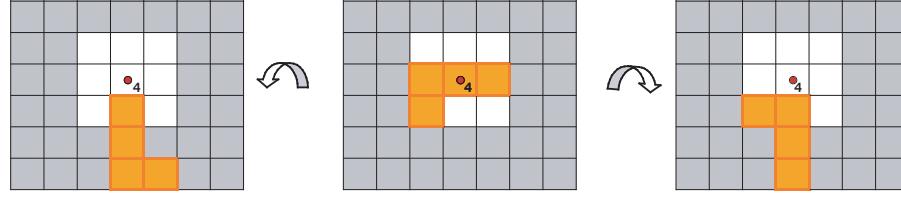
POINT 2:



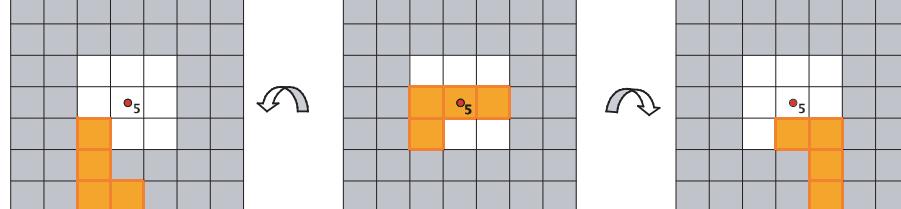
POINT 3:



POINT 4:



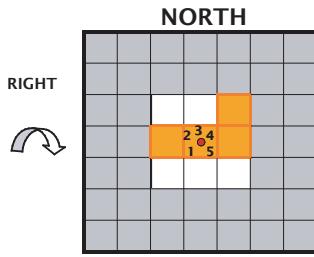
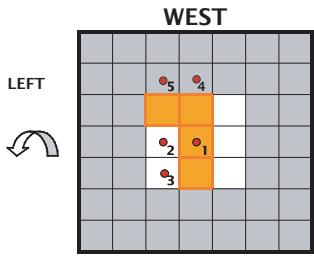
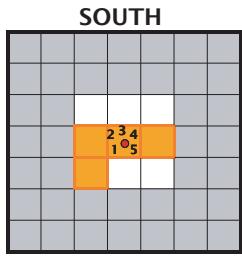
POINT 5:



Tetris® Design Guideline

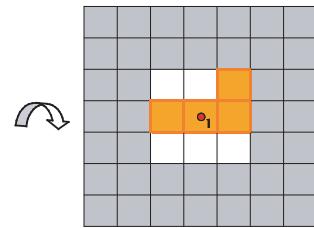
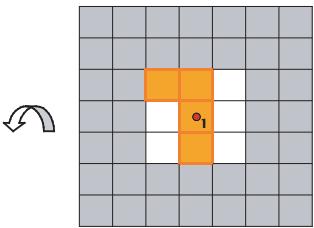
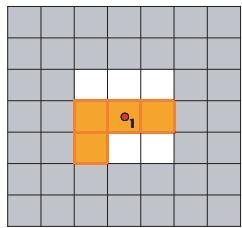
March, 2009

'L' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = WEST



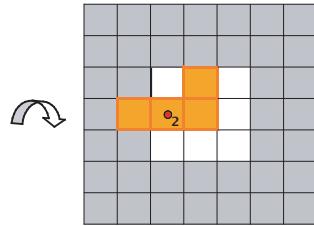
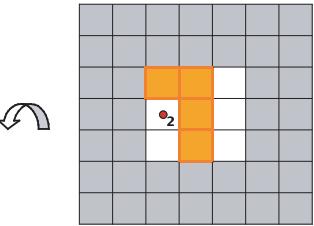
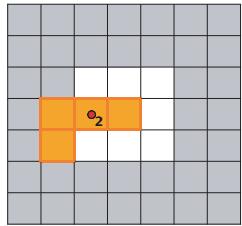
POINT 1:

A. VISUAL

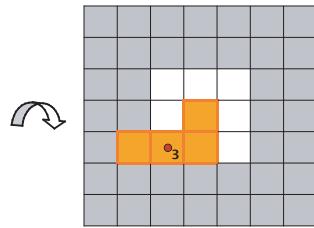
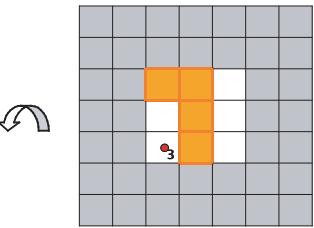
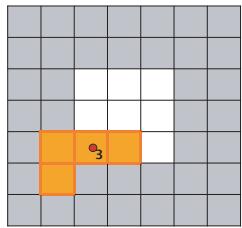


POINT 2:

B. Off the RIGHT Wall

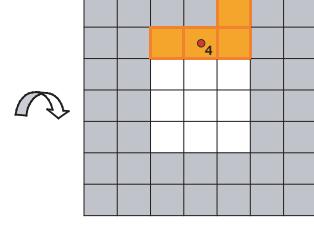
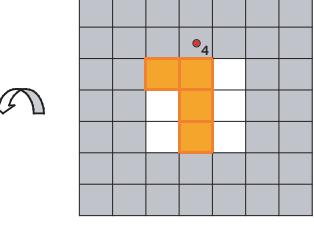
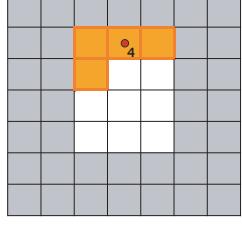


POINT 3:



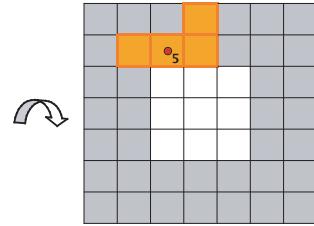
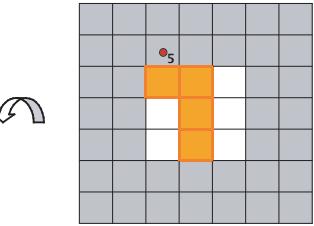
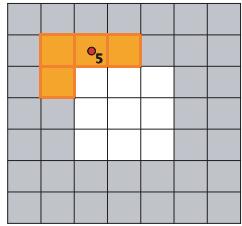
POINT 4:

F. Out of LEFT Well



POINT 5:

E. Out of RIGHT Well

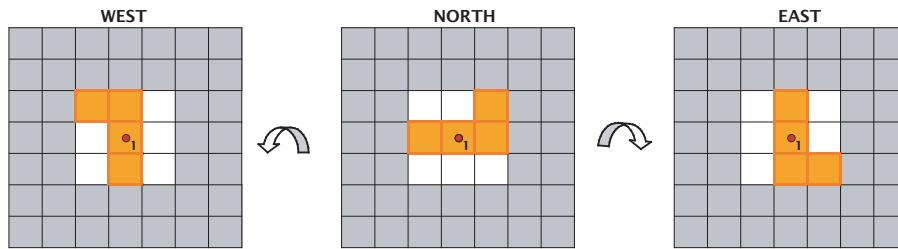


APPENDIX A THE TETRIS ENGINE

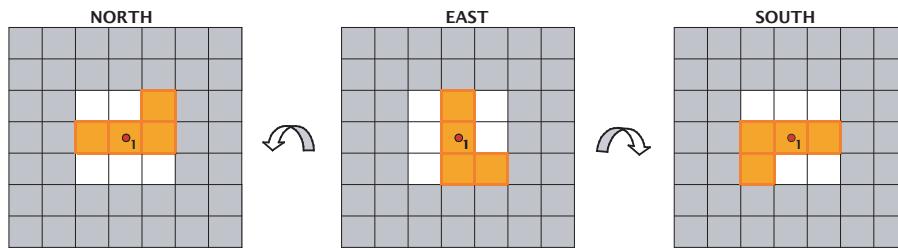
PRIMARY ROTATIONS

A. VISUAL

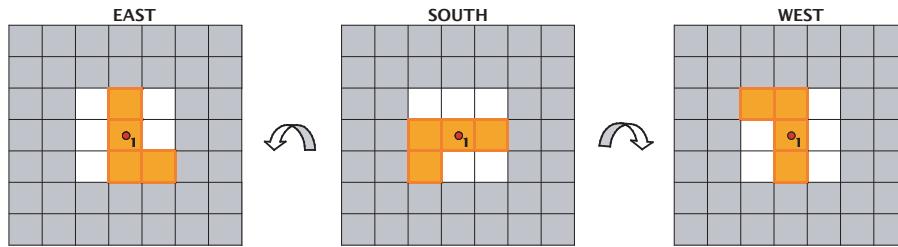
POINT 1:



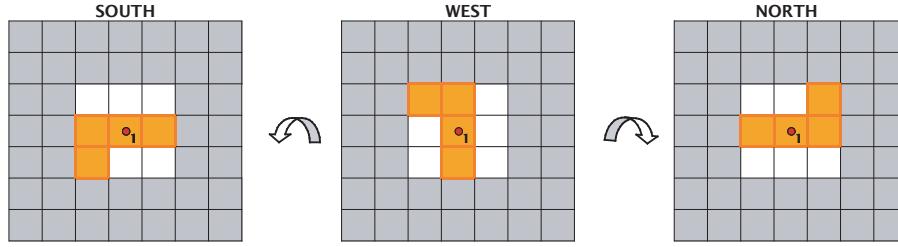
POINT 1:



POINT 1:

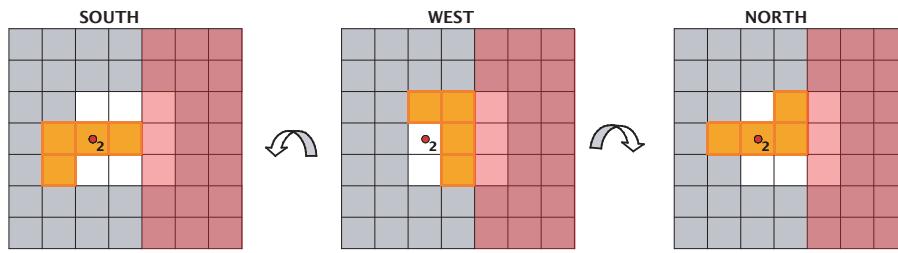


POINT 1:



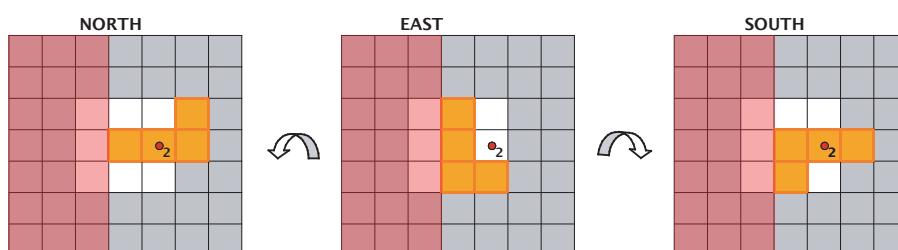
B. Off RIGHT Wall

POINT 2:



C. Off LEFT Wall

POINT 2:

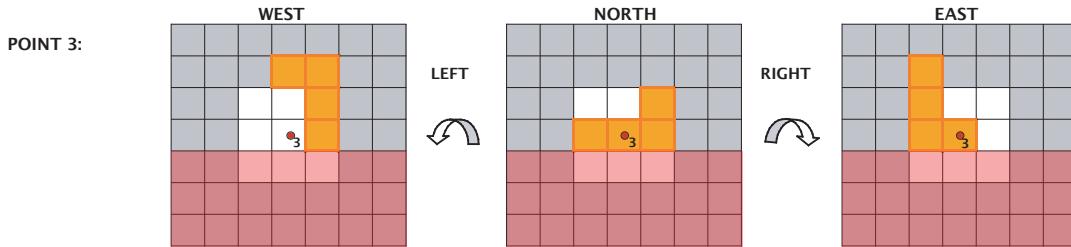


Tetris® Design Guideline

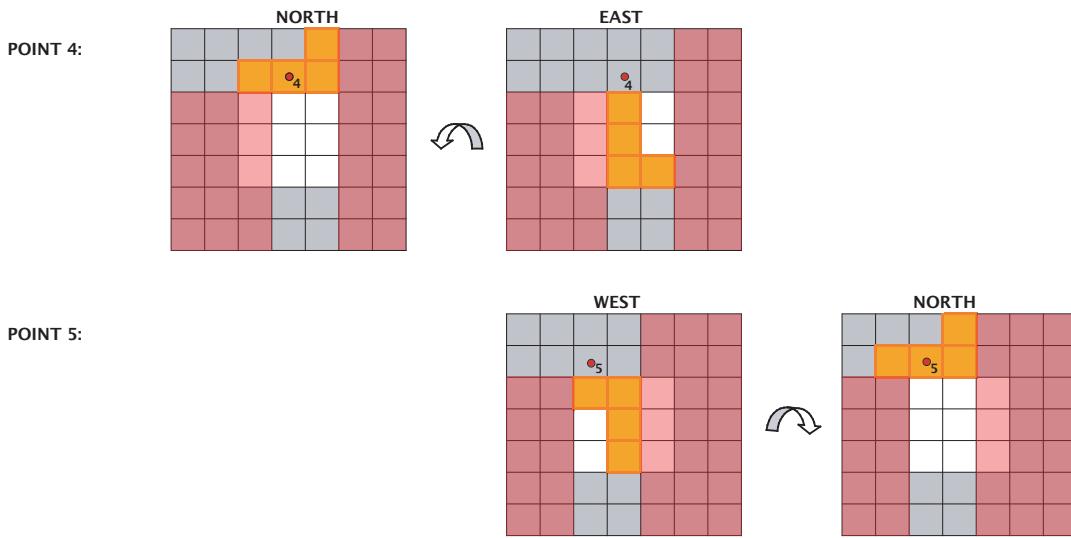
March, 2009

PRIMARY ROTATIONS (cont'd)

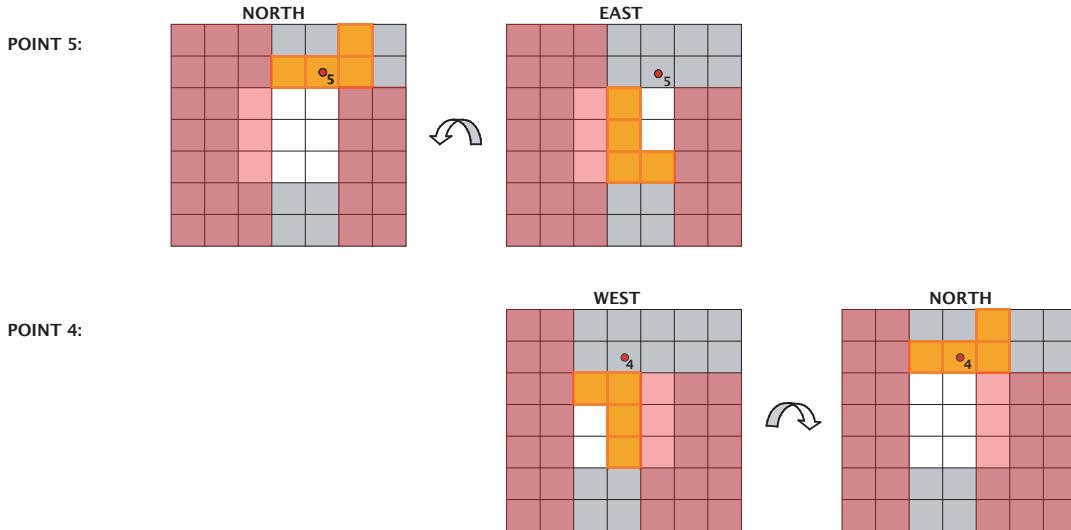
D. Off the FLOOR



E. Out of RIGHT Well

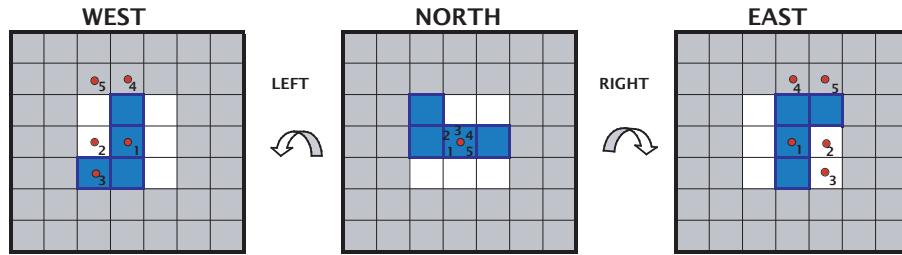


F. Out of LEFT Well



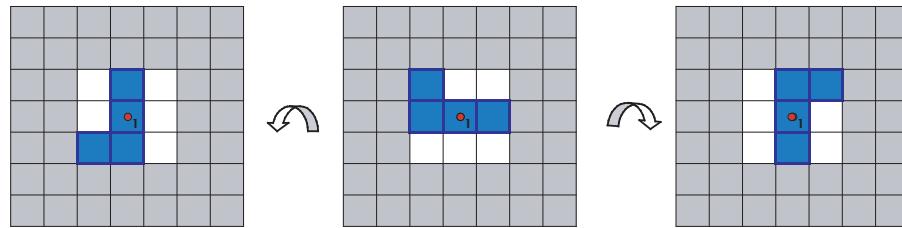
APPENDIX A THE TETRIS ENGINE

'J' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = NORTH

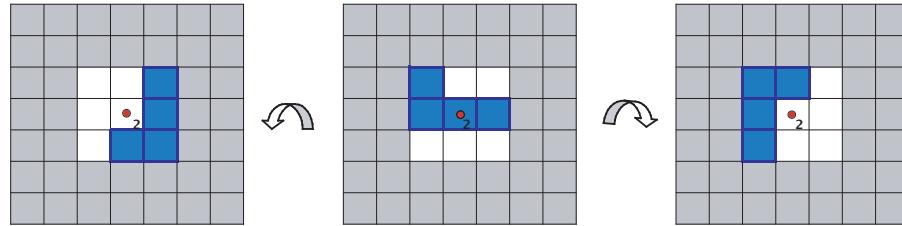


POINT 1:

A. VISUAL

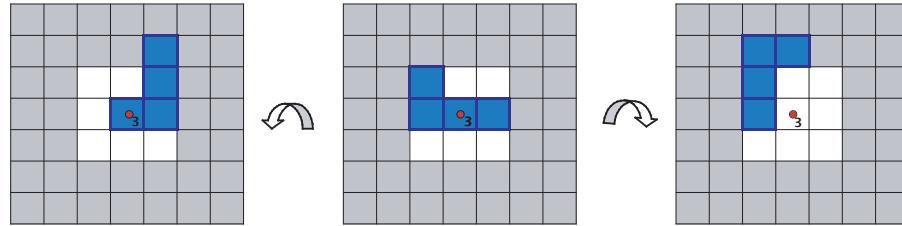


POINT 2:

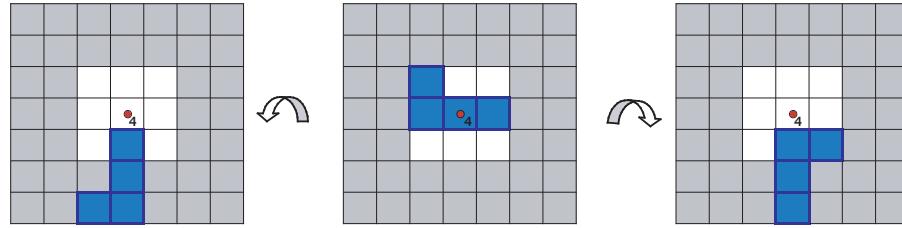


POINT 3:

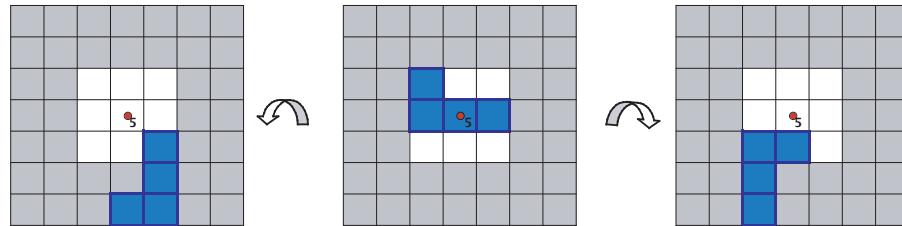
D. Off the FLOOR



POINT 4:



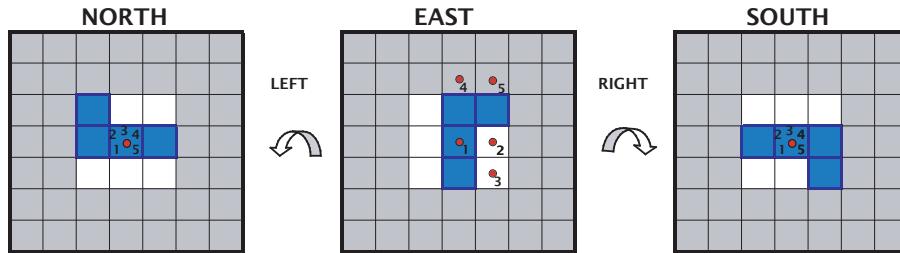
POINT 5:



Tetris® Design Guideline

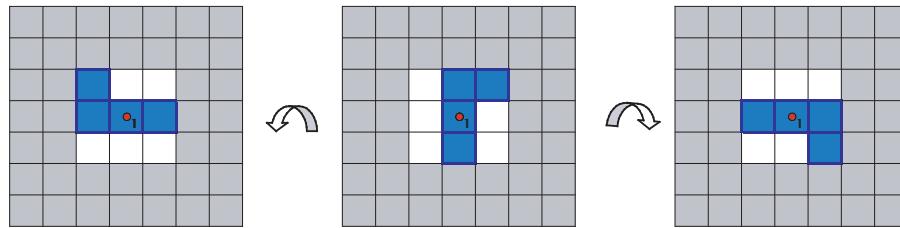
March, 2009

'J' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = EAST



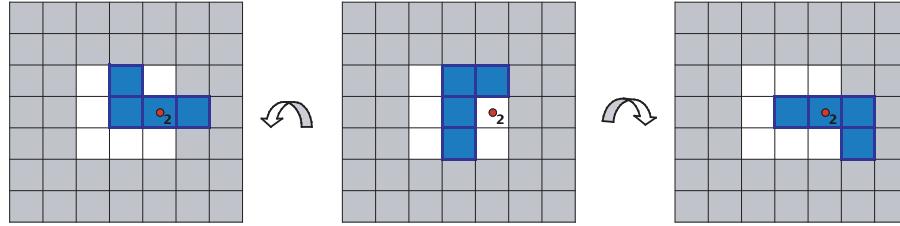
POINT 1:

A. VISUAL

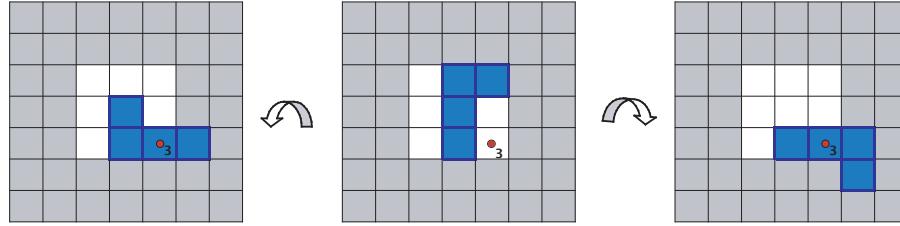


POINT 2:

C. Off the LEFT Wall

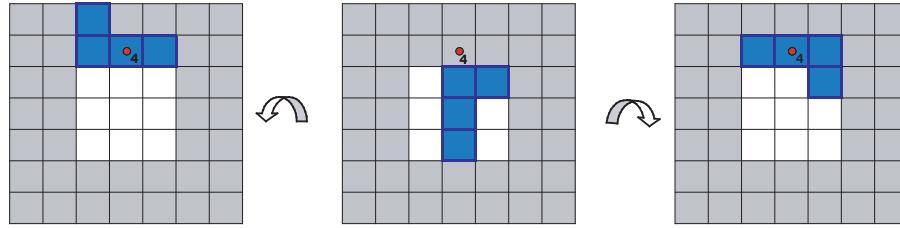


POINT 3:



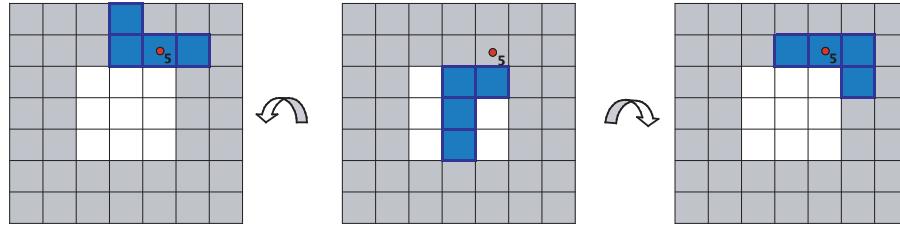
POINT 4:

E. Out of RIGHT Well



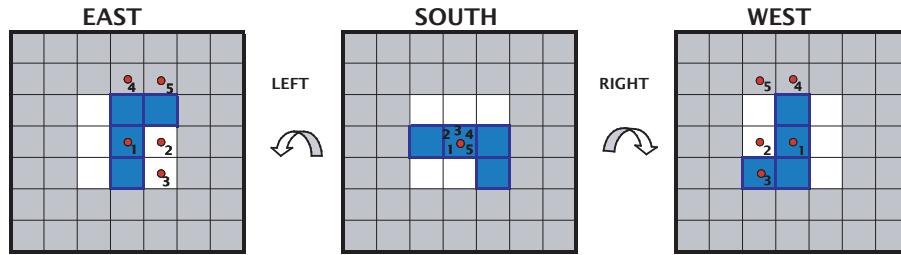
POINT 5:

F. Out of LEFT Well



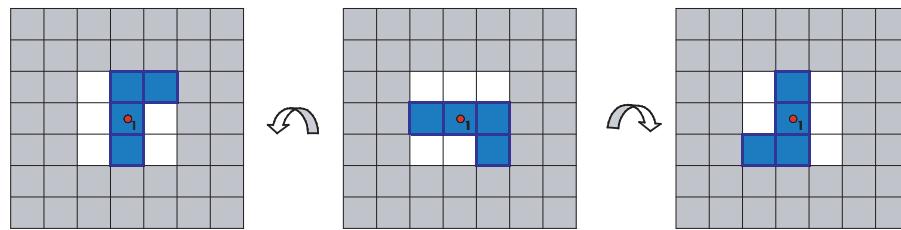
APPENDIX A THE TETRIS ENGINE

'J' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = SOUTH

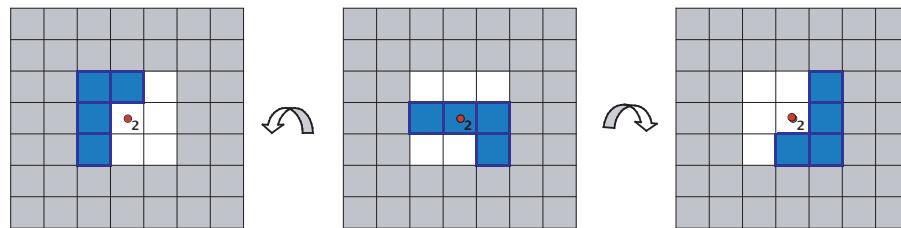


POINT 1:

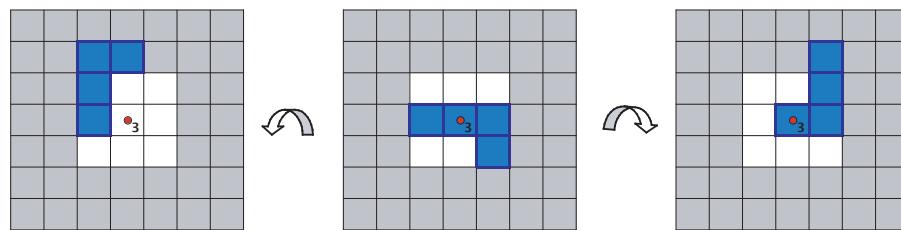
A. VISUAL



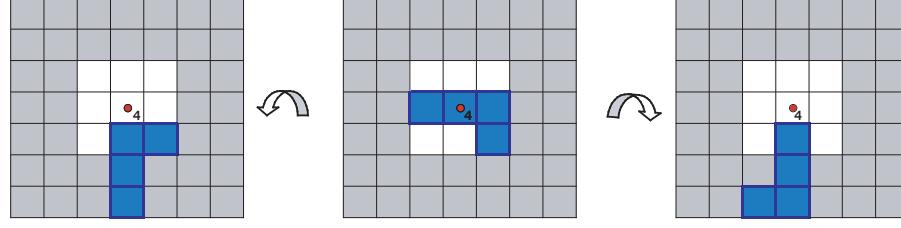
POINT 2:



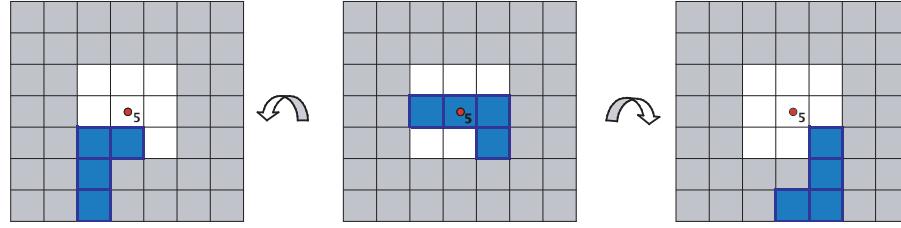
POINT 3:



POINT 4:



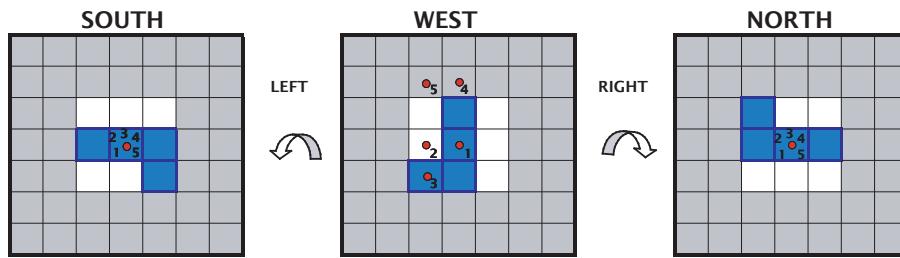
POINT 5:



Tetris® Design Guideline

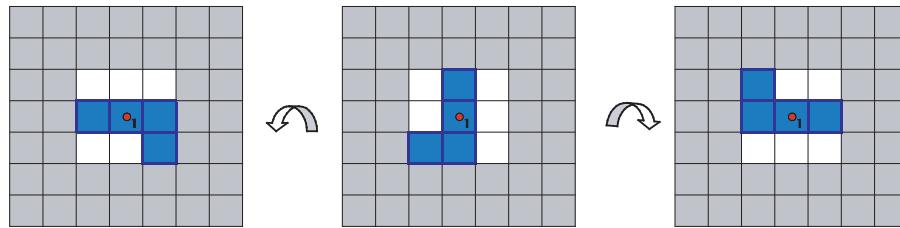
March, 2009

'J' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = WEST



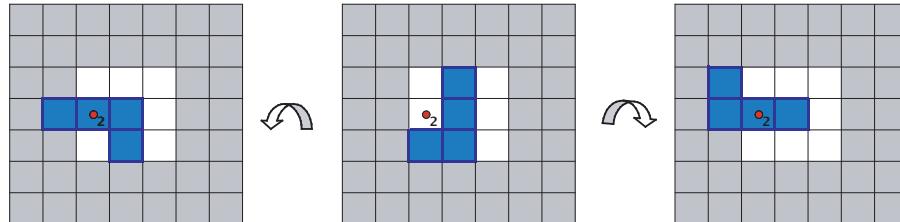
POINT 1:

A. VISUAL

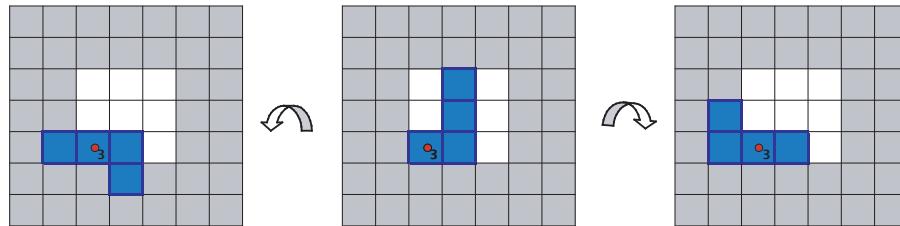


POINT 2:

B. Off the RIGHT Wall

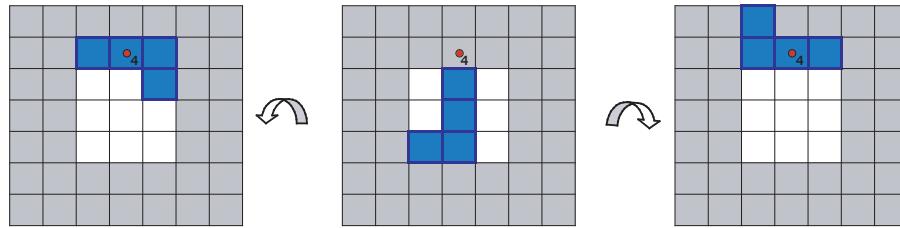


POINT 3:



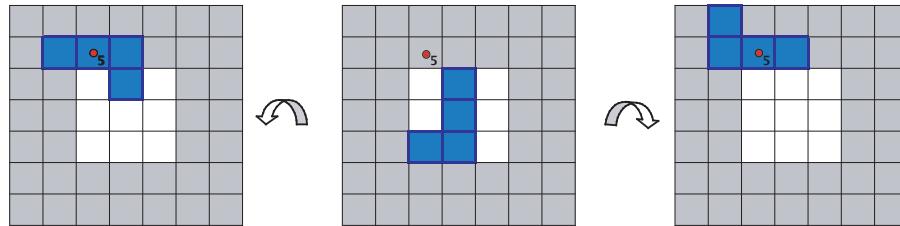
POINT 4:

F. Out of LEFT Well



POINT 5:

E. Out of RIGHT Well

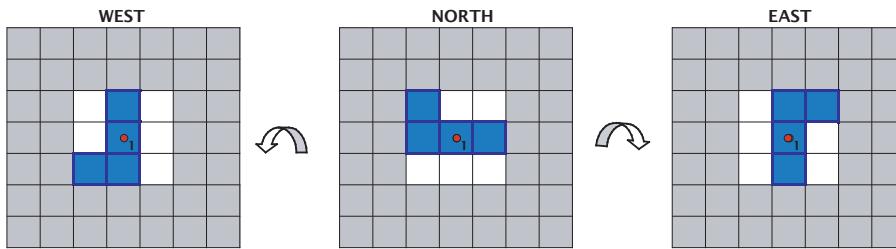


APPENDIX A THE TETRIS ENGINE

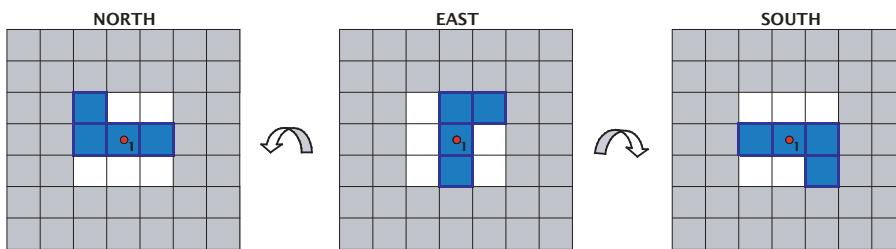
PRIMARY ROTATIONS

A. VISUAL

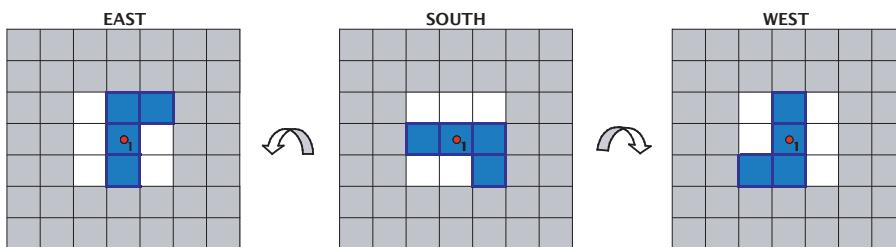
POINT 1:



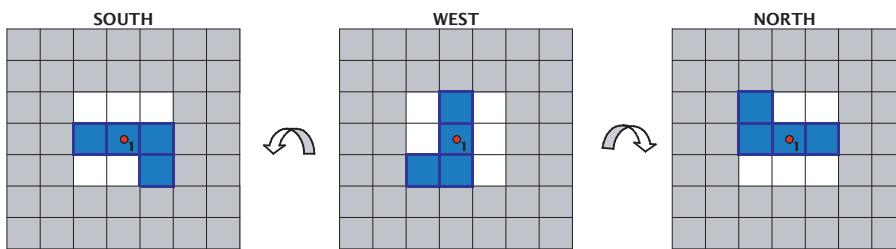
POINT 1:



POINT 1:

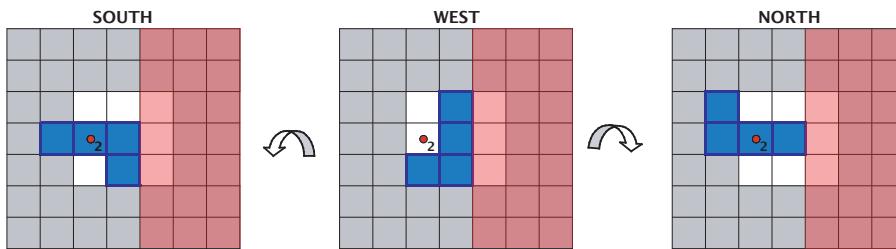


POINT 1:



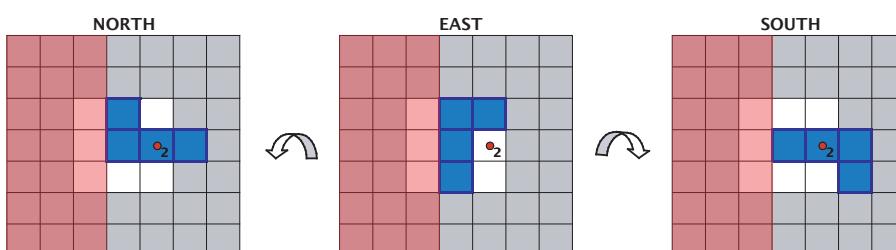
B. Off RIGHT Wall

POINT 2:



C. Off LEFT Wall

POINT 2:

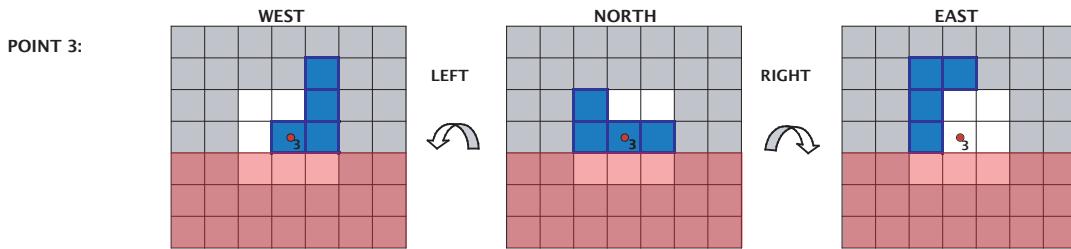


Tetris® Design Guideline

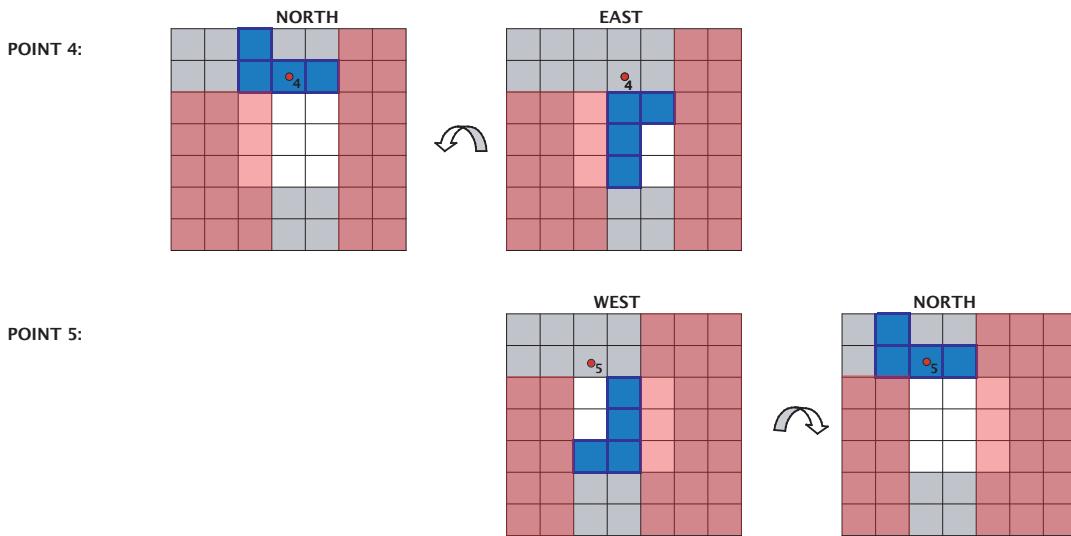
March, 2009

PRIMARY ROTATIONS (cont'd)

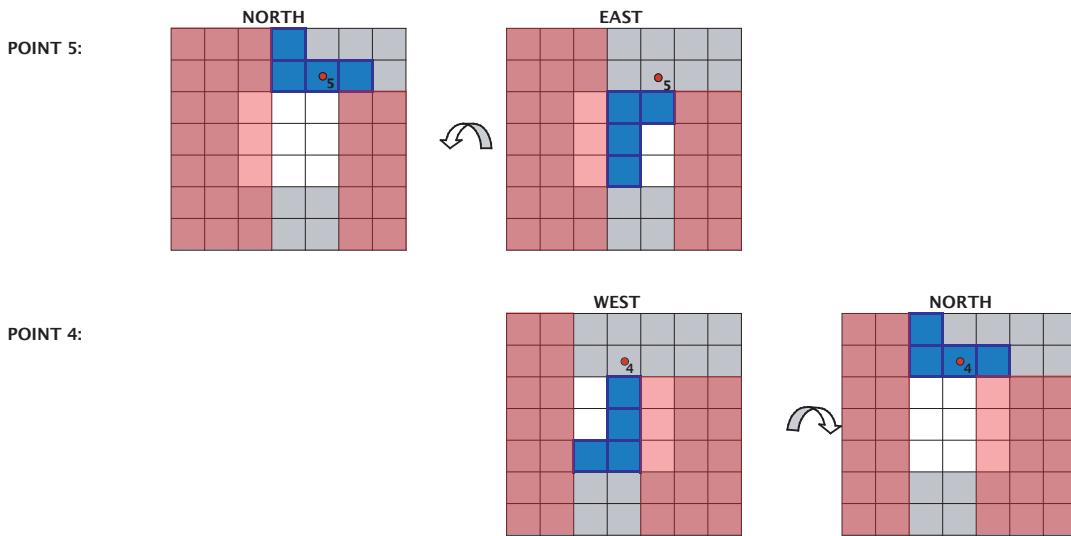
D. Off the FLOOR



E. Out of RIGHT Well

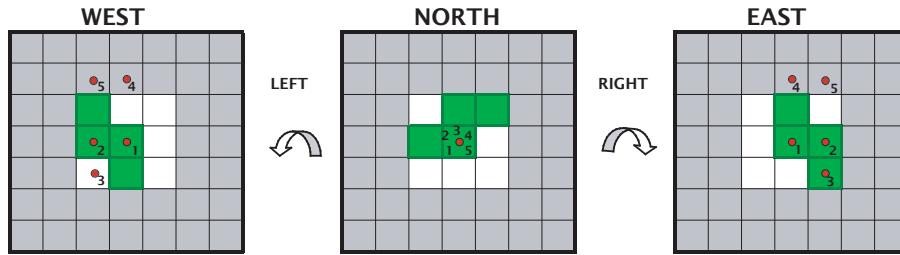


F. Out of LEFT Well



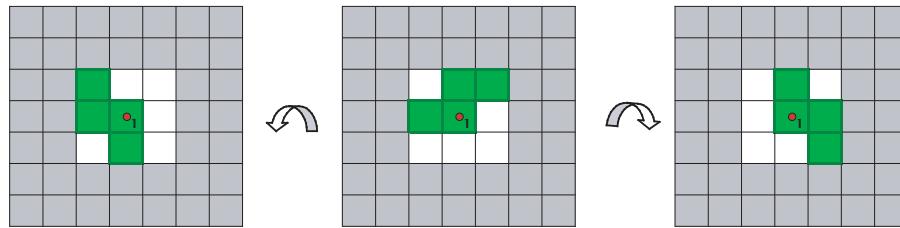
APPENDIX A THE TETRIS ENGINE

'S' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = NORTH

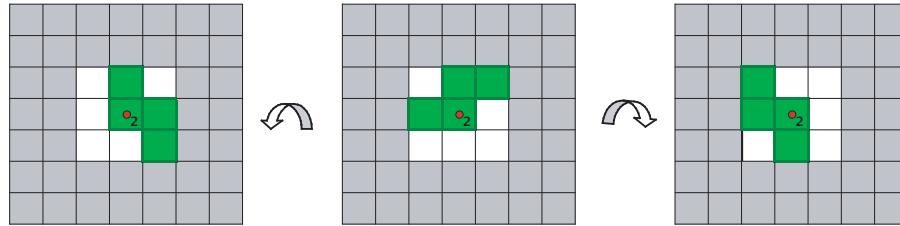


POINT 1:

A. VISUAL

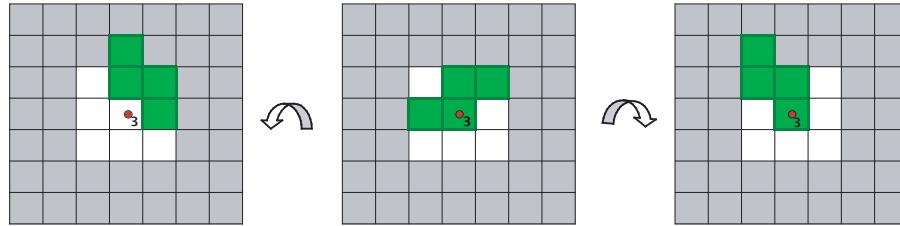


POINT 2:

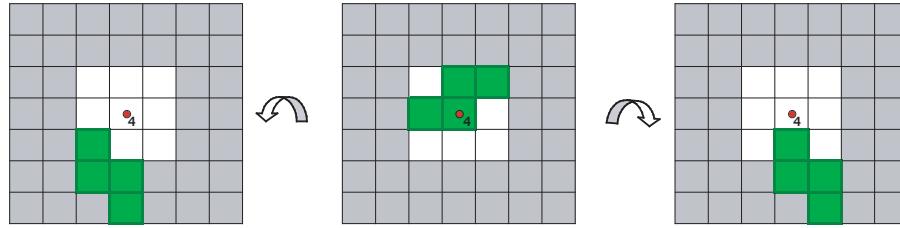


POINT 3:

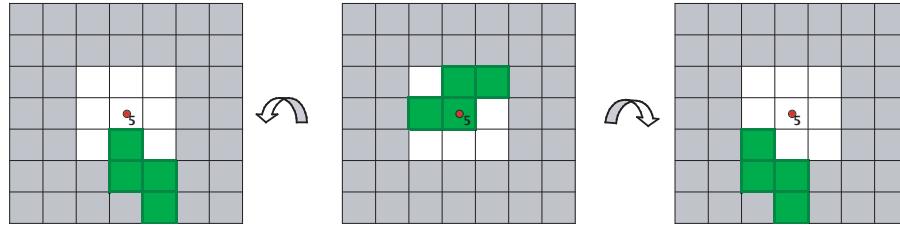
D. Off the FLOOR



POINT 4:



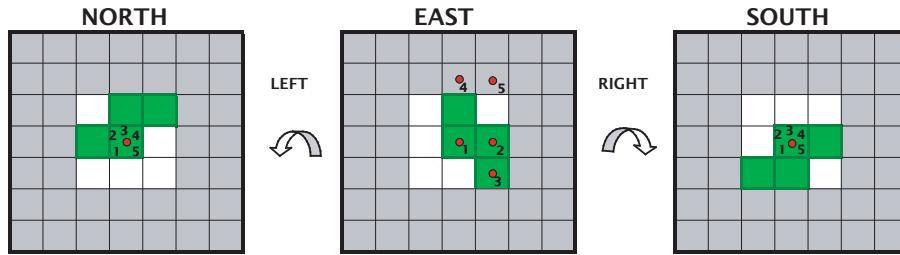
POINT 5:



Tetris® Design Guideline

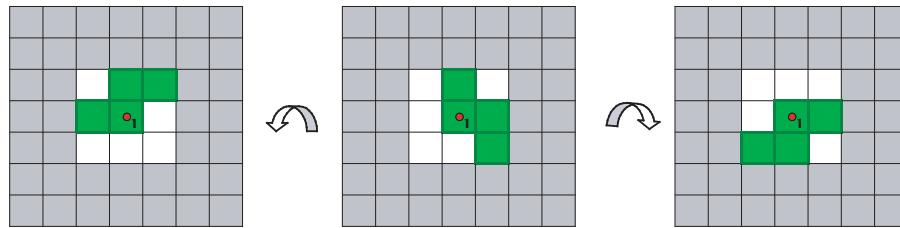
March, 2009

'S' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = EAST



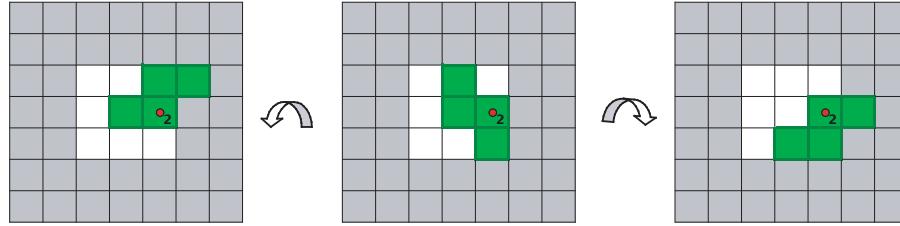
POINT 1:

A. VISUAL

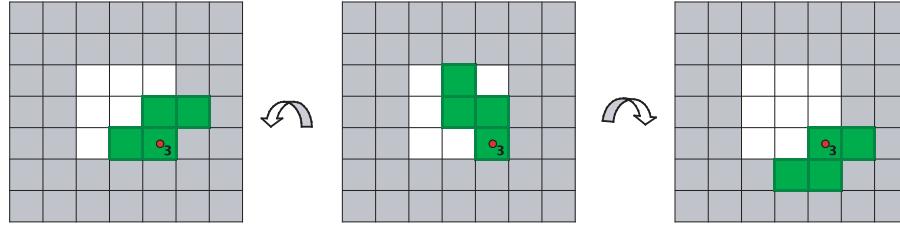


POINT 2:

C. Off the LEFT Wall

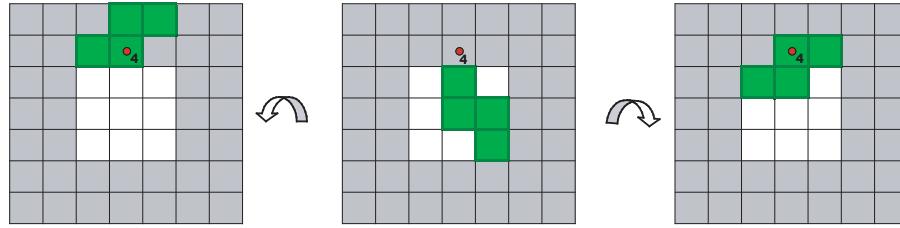


POINT 3:



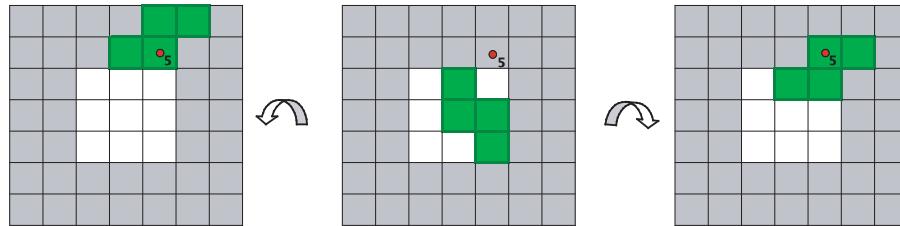
POINT 4:

E. Out of RIGHT Well



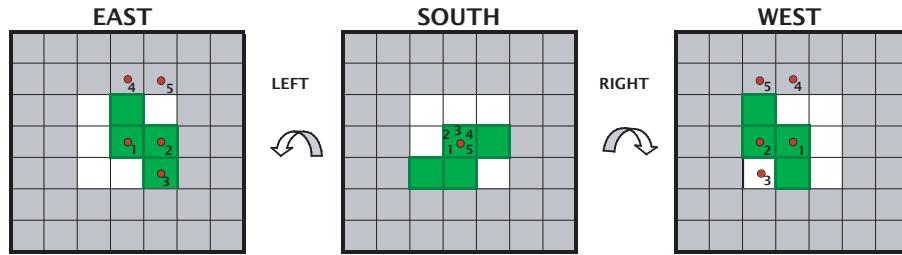
POINT 5:

F. Out of LEFT Well



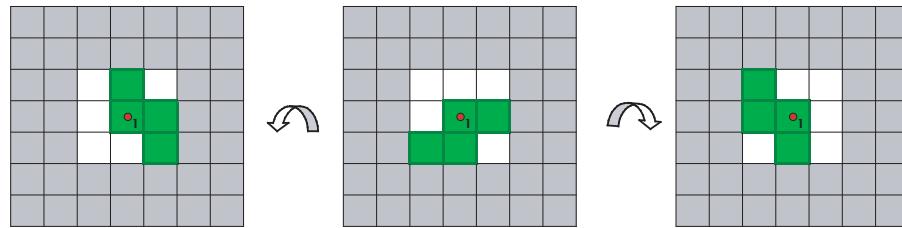
APPENDIX A THE TETRIS ENGINE

'S' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = SOUTH

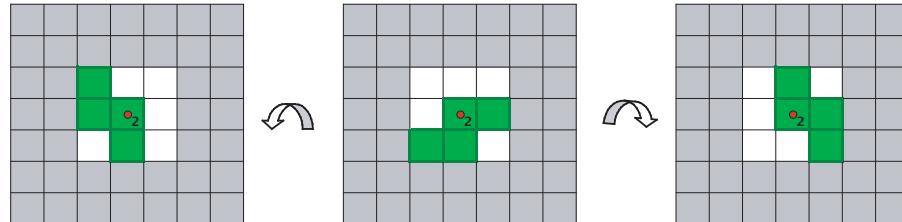


POINT 1:

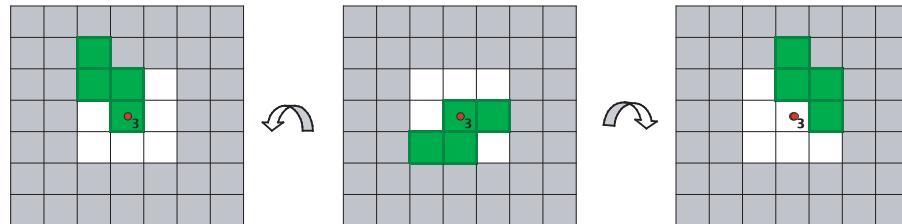
A. VISUAL



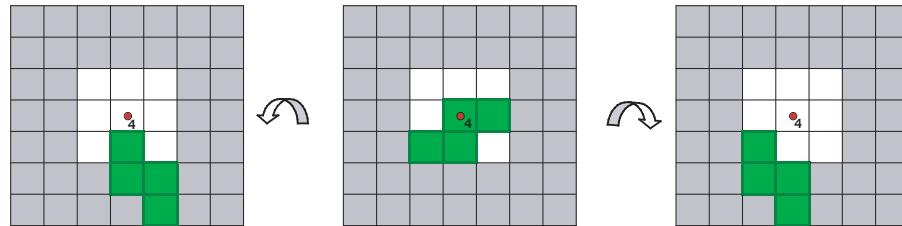
POINT 2:



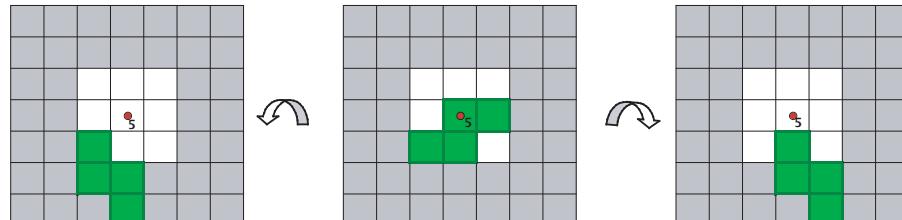
POINT 3:



POINT 4:



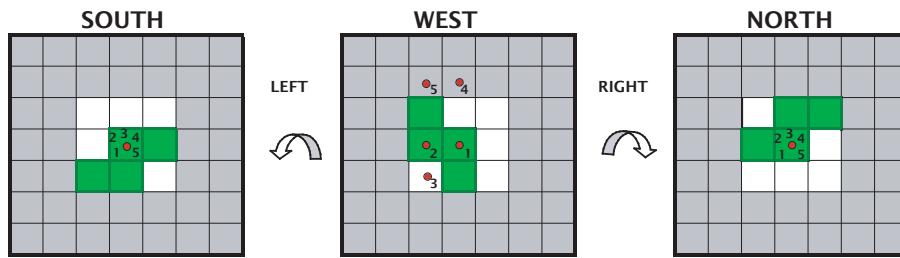
POINT 5:



Tetris® Design Guideline

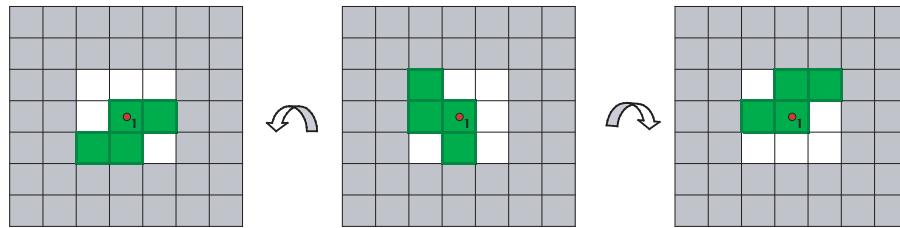
March, 2009

'S' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = WEST



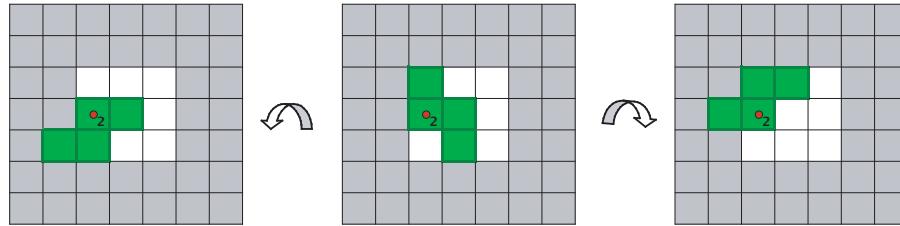
POINT 1:

A. VISUAL

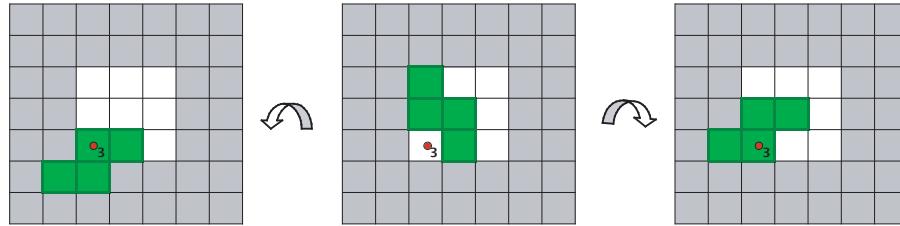


POINT 2:

B. Off the RIGHT Wall

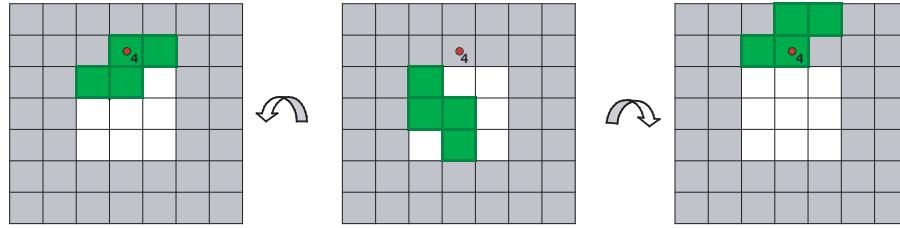


POINT 3:



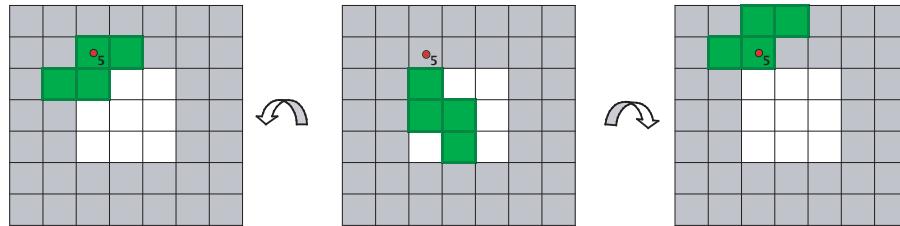
POINT 4:

F. Out of LEFT Well



POINT 5:

E. Out of RIGHT Well

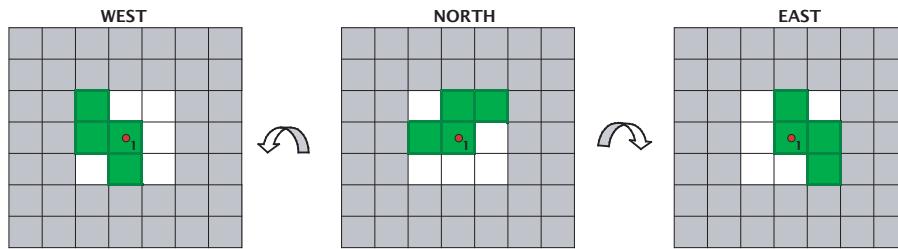


APPENDIX A THE TETRIS ENGINE

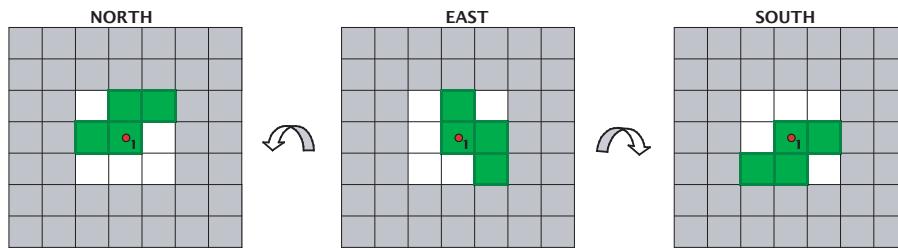
PRIMARY ROTATIONS

A. VISUAL

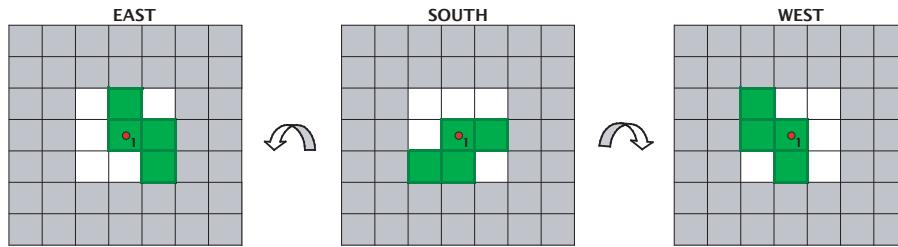
POINT 1:



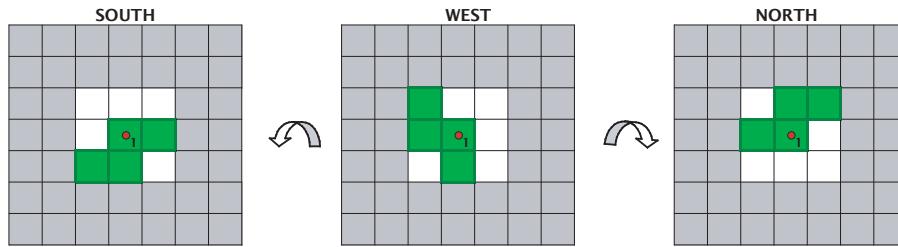
POINT 1:



POINT 1:

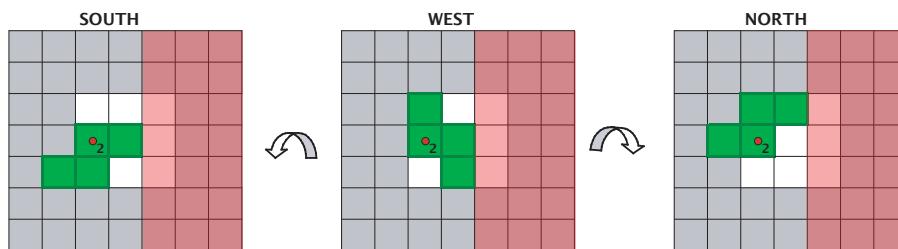


POINT 1:



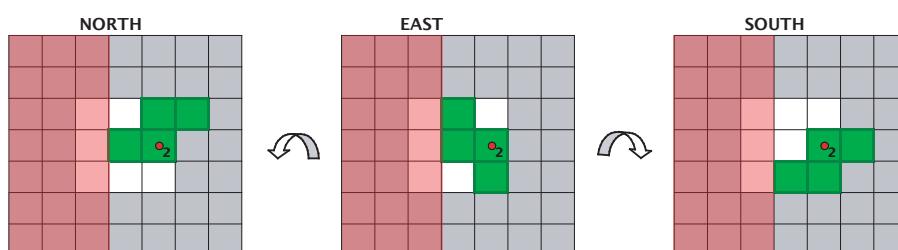
B. Off RIGHT Wall

POINT 2:



C. Off LEFT Wall

POINT 2:

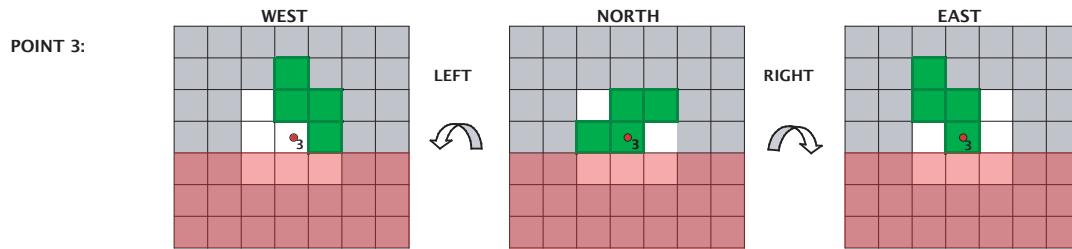


Tetris® Design Guideline

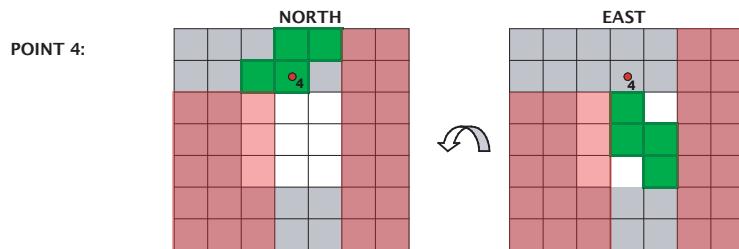
March, 2009

PRIMARY ROTATIONS (cont'd)

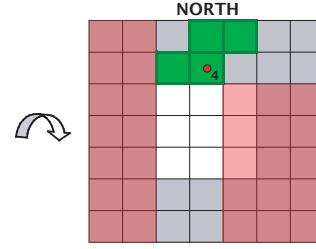
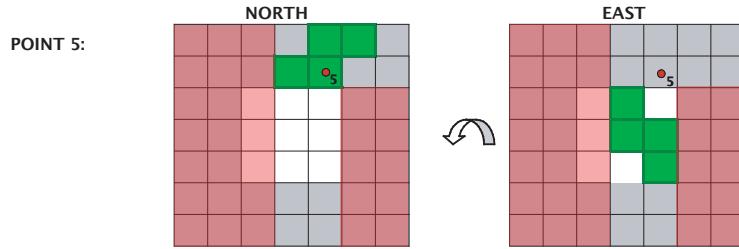
D. Off the FLOOR



E. Out of RIGHT Well

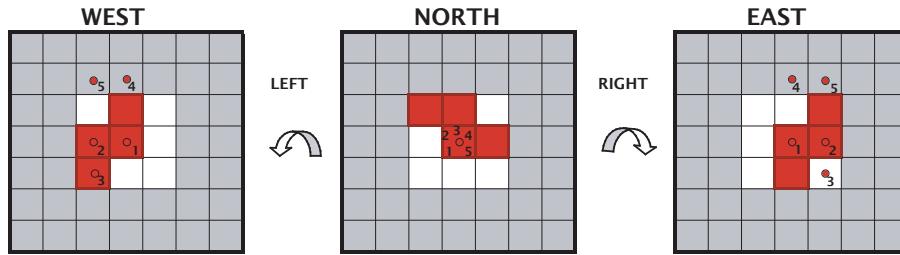


F. Out of LEFT Well



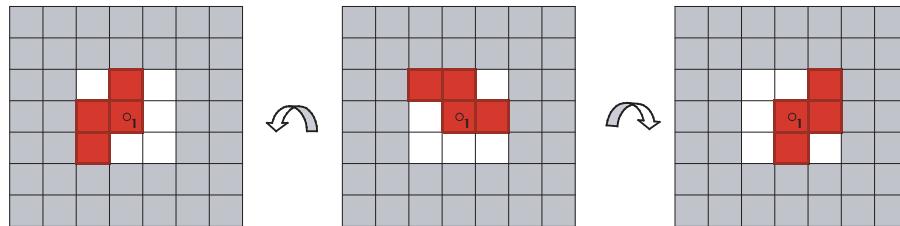
APPENDIX A THE TETRIS ENGINE

'Z' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = NORTH

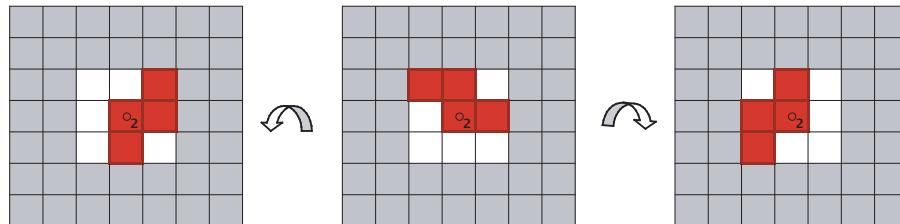


POINT 1:

A. VISUAL

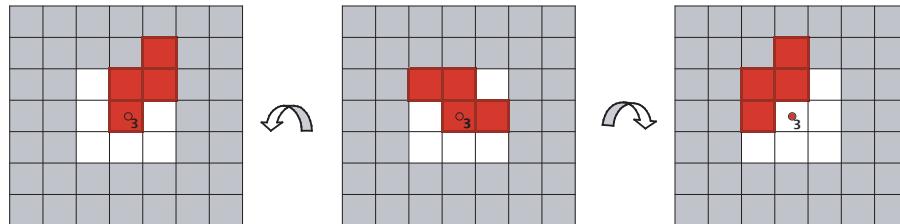


POINT 2:

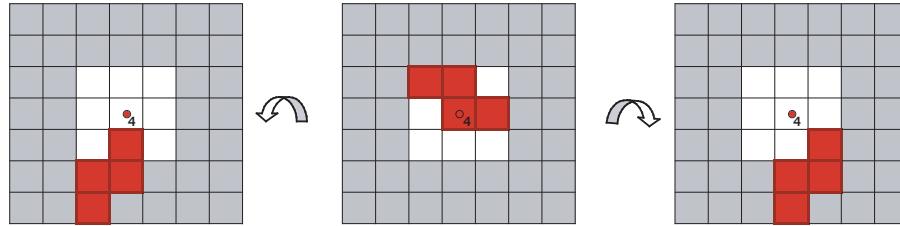


POINT 3:

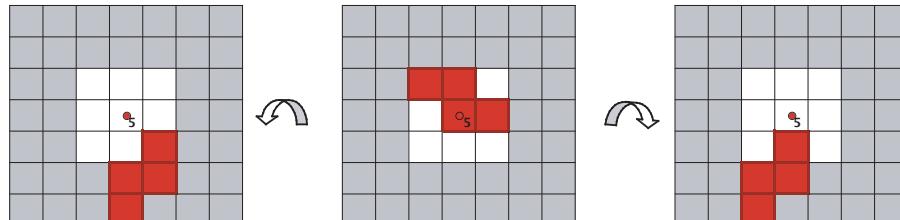
D. Off the FLOOR



POINT 4:



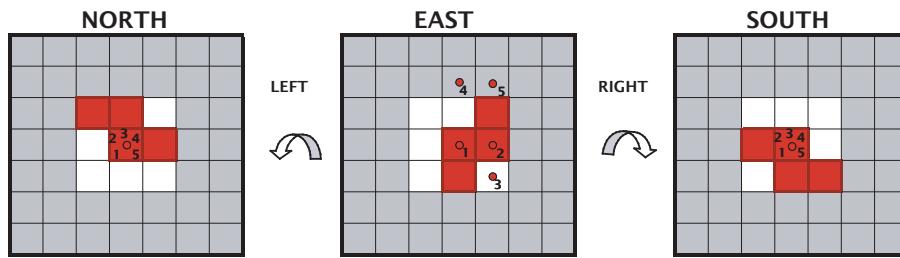
POINT 5:



Tetris® Design Guideline

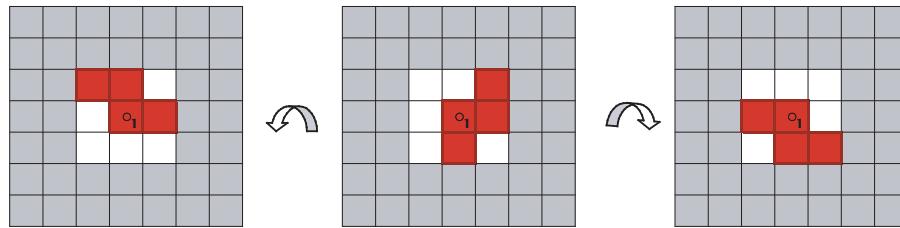
March, 2009

'Z' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = EAST



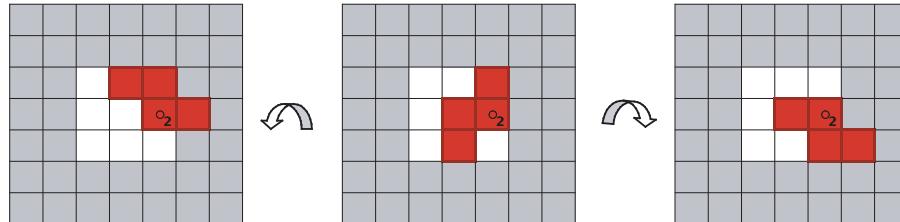
POINT 1:

A. VISUAL

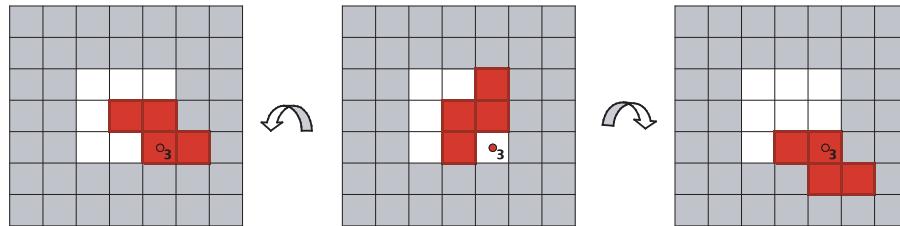


POINT 2:

C. Off the LEFT Wall

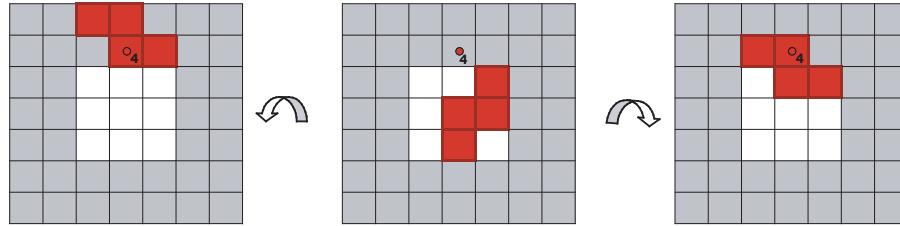


POINT 3:



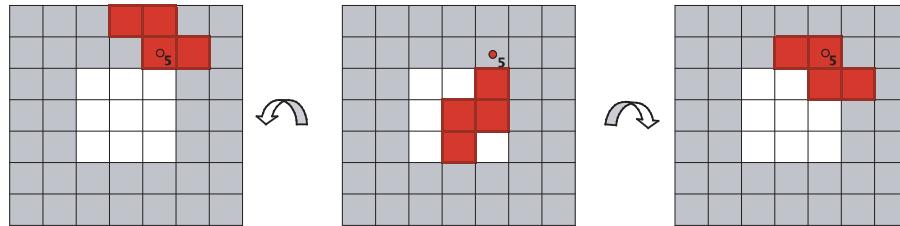
POINT 4:

E. Out of RIGHT Well



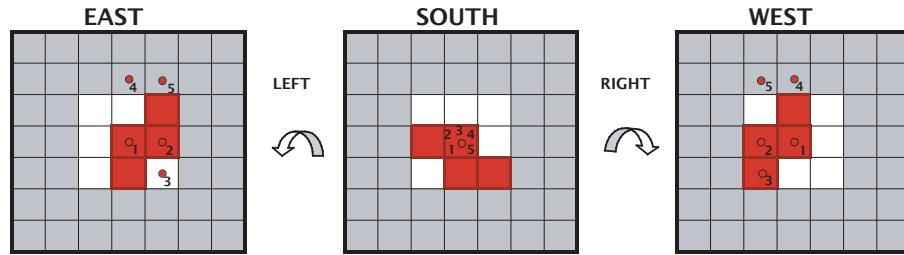
POINT 5:

F. Out of LEFT Well



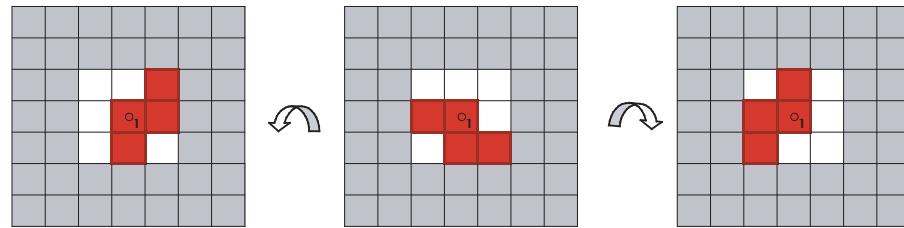
APPENDIX A THE TETRIS ENGINE

'Z' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = SOUTH

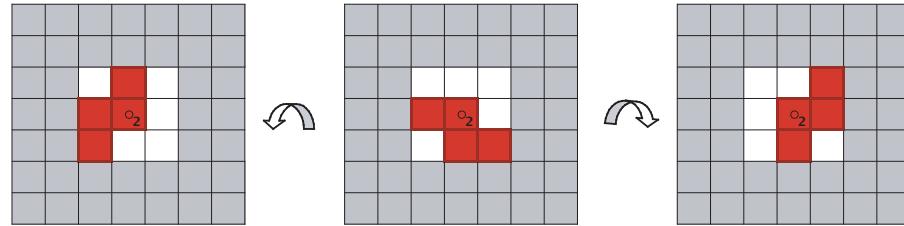


POINT 1:

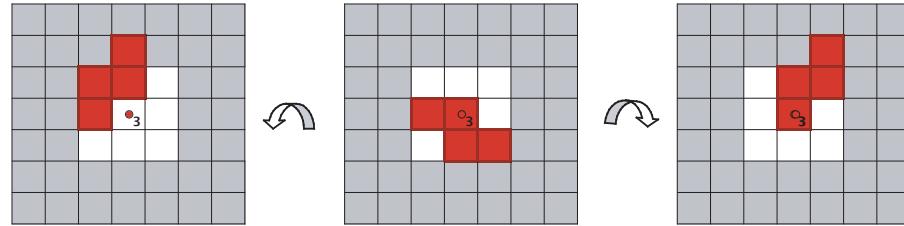
A. VISUAL



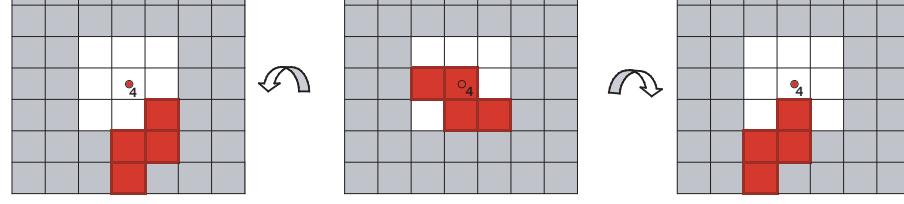
POINT 2:



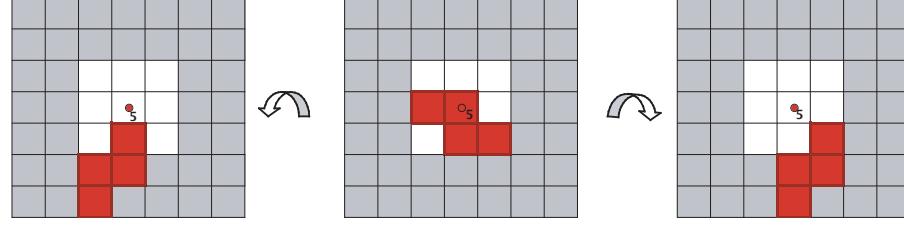
POINT 3:



POINT 4:



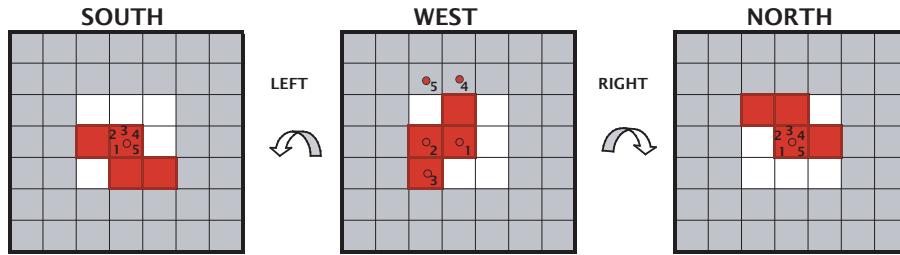
POINT 5:



Tetris® Design Guideline

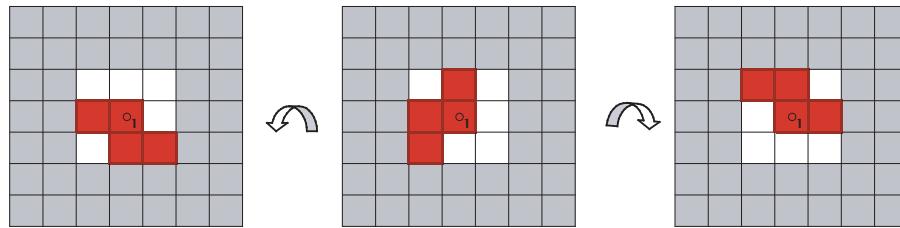
March, 2009

'Z' TETRIMINO: LEFT & RIGHT ROTATION, START POSITION = WEST



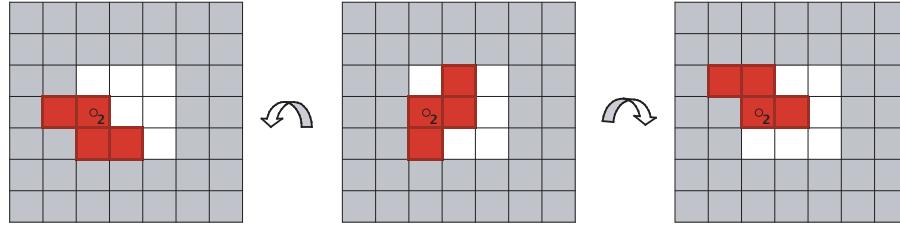
POINT 1:

A. VISUAL

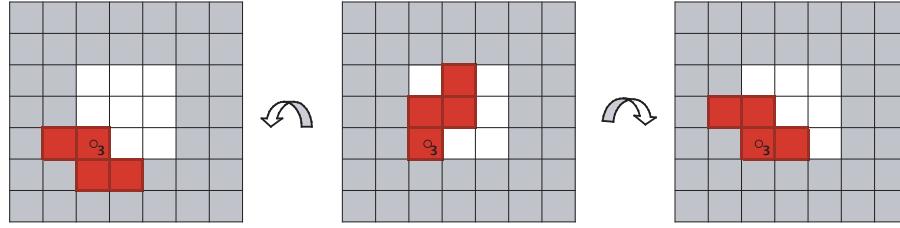


POINT 2:

B. Off the RIGHT Wall

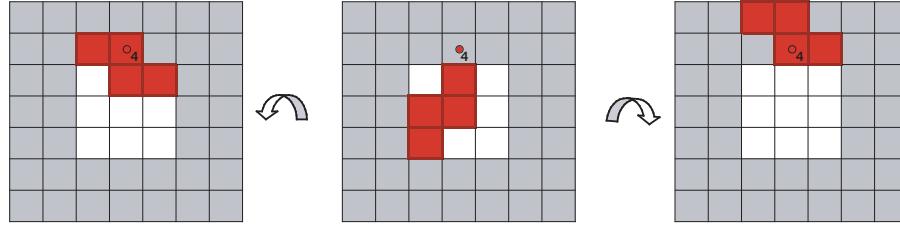


POINT 3:



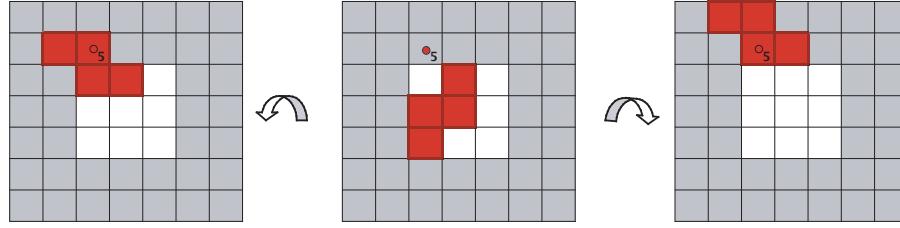
POINT 4:

F. Out of LEFT Well



POINT 5:

E. Out of RIGHT Well

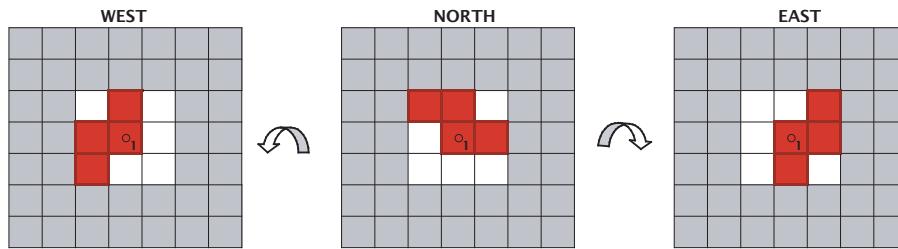


APPENDIX A THE TETRIS ENGINE

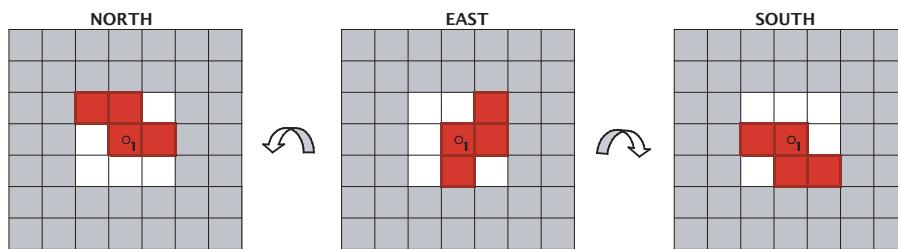
PRIMARY ROTATIONS

A. VISUAL

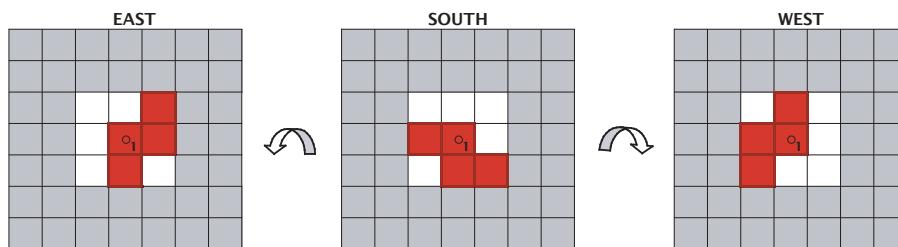
POINT 1:



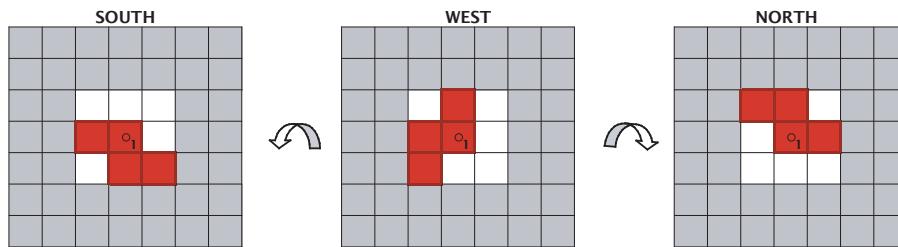
POINT 1:



POINT 1:

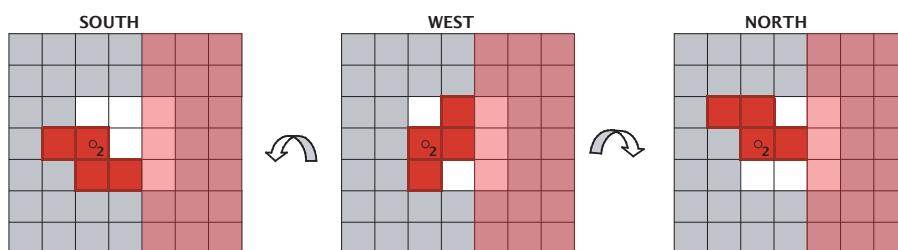


POINT 1:



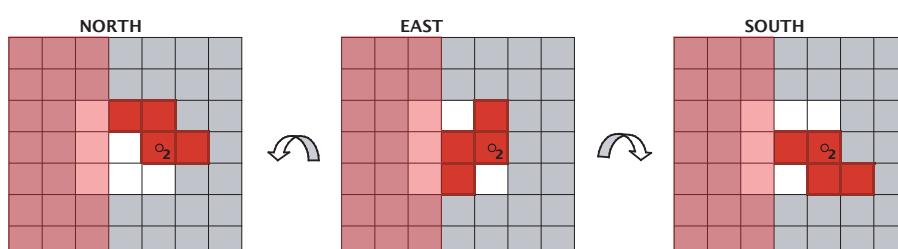
B. Off RIGHT Wall

POINT 2:



C. Off LEFT Wall

POINT 2:

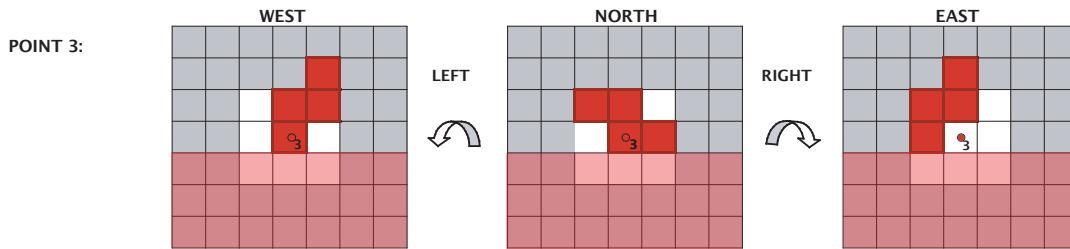


Tetris® Design Guideline

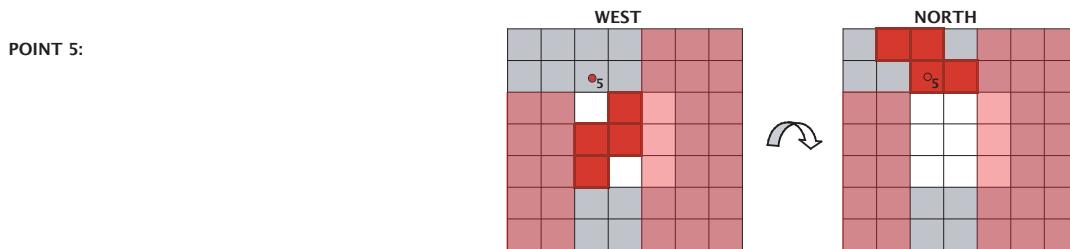
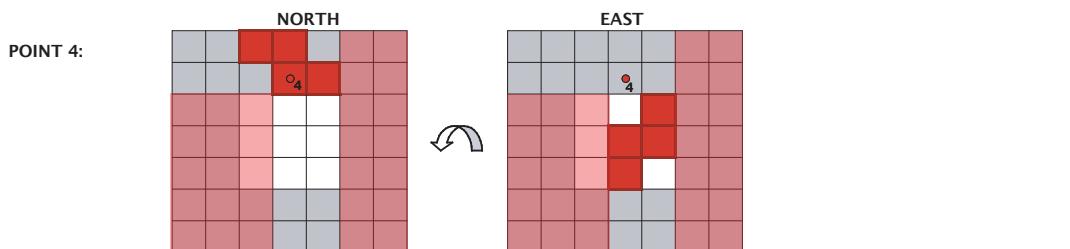
March, 2009

PRIMARY ROTATIONS (cont'd)

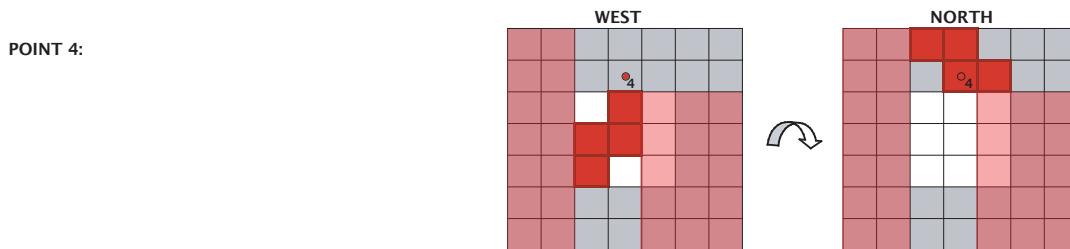
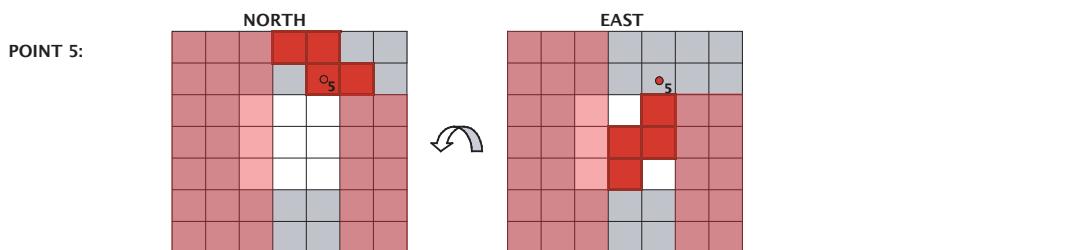
D. Off the FLOOR



E. Out of RIGHT Well



F. Out of LEFT Well



APPENDIX B MULTIPLAYER

B1.1 INTRODUCTION

B1.1.1 What is Tetris Multiplayer?

Tetris Multiplayer may be defined as any Tetris variant where more than one player plays at the same time, either cooperatively or competitively. This appendix explains typical features or elements found in successful multiplayer games. In addition, it provides direction for the Line Attack/Counter Attack scoring system.



B1.1.2 Tetris Multiplayer Terminology

Broken Line: *n.* any line sent to opponents with only one gap in the row. In the typical Multiplayer Tetris variant, Broken Lines are clearable and have just one gap in a random location.

Counter Attack: *n.* an attack against an opponent's Line Attacks to prevent lines from appearing in one's own Matrix. Before any lines from an action can be sent to an opponent, one's own Receiving Queue must first be cleared.

Line Attack: *n.* this attack sends Broken or Solid Lines of Blocks to opponents (at random or user targeted times, depending on the system used), and can be performed using these actions: Doubles, Triples, Tetrises, T-Spin Singles, T-Spin Doubles, and T-Spin Triples.

Receiving Queue: *n.* a vertical meter that accrues opponents' Line Attacks between Lock Downs. When a Lock Down occurs, any lines accrued in the meter are added to the bottom of that player's Matrix before generation of the Next Tetrimino.

Solid Line: *n.* a row of Blocks without any gaps sent to one or more opposing players. Solid Lines typically cannot be cleared.

Starting Lines: *n.* any rows of Broken or Solid Lines at the beginning of a game. Typically, variants may use different preset or random patterns to mix up game play during a Multiplayer session.

Tetris® Design Guideline

March, 2009

Target Mark: *n.* a movable marker that designates the recipient of a Line Attack. This marker displays near the middle of the opponent's Matrix but is only visible to the player that controls it.

Top Out Line: *n.* the ceiling of the Buffer Zone, 20 rows above the Skyline. This is the absolute topmost line in Tetris, and only in Multiplayer games where Lines Attacks are sent to opponents can the Game Over Condition known as Top Out occur.

B1.2 GAME TYPES

B1.2.1 Competitive Tetris Multiplayer

The main objective in Competitive Tetris Multiplayer is to force one or more opponents (humans or AI) to the top of the screen for a game over. Competitive can be played solo or in teams, typically two teams of two to three people per team.

To create exciting, strategic, and faster paced games, Tetris Multiplayer games usually have A) a Line Attack system which affects other players, and occasionally B) a progressively faster Fall Speed (or some other preset difficulty) as either time passes or a certain amount of Tetriminos fall.

Note: In most competitive multiplayer variants, all players should receive the same order of Tetriminos (random for each game played), unless the variant is specifically designed not to do this.

Examples:

1 Player vs. 1 Player: This could be a standard versus variant with Line Attacks.

1 Player vs. 1 Computer Player: The player could set the computer's artificial intelligence level and then play a standard versus game with Line Attacks to see the winner.

1 Player vs. Players and/or Computer Players: Each player tries to defeat all other players and/or computer opponents. This could be a standard versus variant with Line Attacks.

B1.2.2 Cooperative Tetris Multiplayer

In Cooperative Tetris Multiplayer, one or more players join forces to achieve a goal, be it to defeat a computer opponent, or clear a set number of lines in the shortest amount of time. Cooperative Tetris Multiplayer games are always played in teams, however, teammates may include one or more computer controlled players.

Examples:

Player Team vs. Player Team: Playing to defeat another human team using either the same winning objective or different counter objectives. For example, a team of three players takes on another team of three players.

Player Team vs. Computer Team: Playing to defeat a team of computer opponents using either the same winning objective or different counter objectives.

Player Team vs. Player Teams and/or Computer Teams: Playing to defeat other teams using either the same winning objective or different counter objectives. Teams may be human controlled, computer controlled, or both.

B1.2.3 Practice Mode

Whether in competitive or cooperative multiplayer games, if any player potentially must wait for the other player(s) to finish, there should be a practice mode where that player immediately may begin playing on the current level until the other players finish or the goal is completed. If the practicing player reaches the top of the Matrix, another practice session may start until other players finish the game or goal.

After the goal is completed or game finished, the practicing player(s) may then join in the game.

Note: The word "Practice" must be predominantly displayed somewhere in the Matrix area.

B1.3 LINE ATTACK SYSTEM

The standard Tetris Multiplayer game has included a Line Attack and Counter Attack system which sends lines of Blocks (either broken or solid) to opponents so that they reach the top of the Matrix and are eliminated from the game first.

Players send lines by achieving a Double, Triple, Tetris, T-Spin Single/Double/Triple Line Clear, and for Back-to-Backs. Depending on the action achieved, more or less lines may be sent to opponents (as seen in the table on the next page).

B1.3.1 Broken and Solid Lines

Lines sent to all opponents (if more than one) are identical, appear in the Matrix from the bottom upward, and are categorized into two types:

- Broken Lines are clearable and typically have a single-cell gap.
- Solid Lines are un-clearable, and every line appears as a solid line with no gaps.

Typical Tetris Multiplayer games have Broken Lines rather than Solid Lines sent to opposing players.

B1.3.2 Gap Randomness in Broken Lines

After every eight new lines appear in a player's Matrix, the next eight lines have the single gap in a different random location. New lines ready to be added from the Receiving Queue do not count - only the ones appearing in the Matrix.

B1.3.3 Receiving Queue

Next to each player's Matrix is a bar or visual indicator that displays how many lines are incoming. New lines are added to the Matrix from the bottom up, and appear only after the player's Tetrimino Locks Down.

B1.3.4 Counter Attacks

If there are lines in the Receiving Queue ready to be added to the Matrix, then when a Lock Down occurs, the player first reduces the Receiving Queue by the same number of lines that would have been sent to opponents. If there are leftover lines, the remaining lines then get sent to the opponents.

Tetris® Design Guideline

March, 2009

B1.3.5 Table of Line Attacks

The following table shows how many lines are sent to opponents. Before lines are sent, any lines in the Receiving Queue must first be reduced (see **Table of Counter Attacks**).

Action	# of Lines Sent
Single	0
Double	1
Triple	2
Tetris	4
T-Spin/Mini T-Spin/ Mini T-Spin Single	0
T-Spin Single	2
T-Spin Double	4
T-Spin Triple	6
Back-to-Back	+1

B1.3.6 Table of Counter Attacks

In the following table, the left column shows each of the possible actions for sending lines to opponents in variants using this system. Along the top is the height (in number of lines) of the current Receiving Queue before a Lock Down. In the middle of the table are the results of the action on the left against the Receiving Queue on top.

For example, if any lines were sent (S), the number "2 S" would refer to the total number of lines sent to the opponent, including the reduction of the Receiving Queue, if any. If an "R" follows the number, it means the action was not enough to negate the entire Receiving Queue, and the player's Matrix is filled from the bottom up by that many lines.

Height of Your Receiving Queue	0 Lines	1 Line	2 Lines	3 Lines	4 Lines	5 Lines ...
Your Action	Total Lines Sent/Remaining as a Result of Your Action* (S=Sent to opponent, R=Remaining in your Receiving Queue. Lines Remaining are added to your Matrix after Lock Down.)					
Single		1 R	2 R	3 R	4 R	5 R
Double	1 S		1 R	2 R	3 R	4 R
Triple	2 S	1 S		1 R	2 R	3 R
Tetris	4 S	3 S	2 S	1 S		1 R
T-Spin/Mini T-Spin/ Mini T-Spin Single		1 R	2 R	3 R	4 R	5 R
T-Spin Single	2 S	1 S		1 R	2 R	3 R
T-Spin Double	4 S	3 S	2 S	1 S		1 R
T-Spin Triple	6 S	5 S	4 S	3 S	2 S	1 S
Back-to-Back	Add +1 lines sent to any action (for the first and any subsequent Back-to-Backs)					
Back-to-Back Tetris	5 S	4 S	3 S	2 S	1 S	

APPENDIX B MULTIPLAYER

Height of Your Receiving Queue	0 Lines	1 Line	2 Lines	3 Lines	4 Lines	5 Lines ...
Back-to-Back T-Spin/Mini T-Spin/ Mini T-Spin Single		1 R	2 R	3 R	4 R	5 R
Back-to-Back T-Spin Single	3 S	2 S	1 S		1 R	2 R
Back-to-Back T-Spin Double	5 S	4 S	3 S	2 S	1 S	
Back-to-Back T-Spin Triple	7 S	6 S	5 S	4 S	3 S	2 S

*After any action, the lines in the player's Receiving Queue are first reduced to zero before lines (if any) are sent to another player.

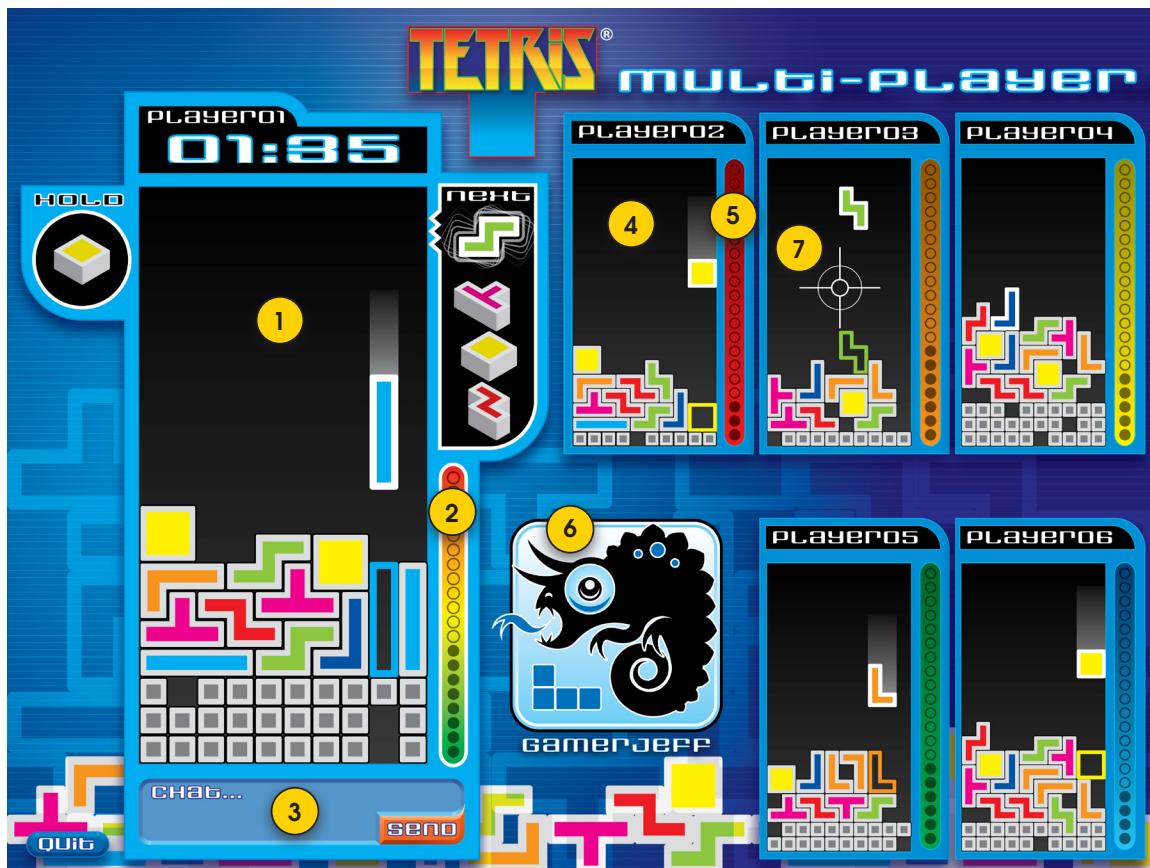
Tetris® Design Guideline

March, 2009

B1.4 USER INTERFACE

Design of the user interface depends on the needs of the players. For games where each player must use the same display device (e.g., a television), more information needs to be shown on the user interface. For sample layouts of this type, see the **Main Menu** section.

For games where each player has a separate display device (e.g., a monitor), the user interface can be customized with existing conventions for multiplayer games. The following is a sample layout for this type of game. It is not required that Tetris Multiplayer games follow this layout.



B1.4.1 Game Screen

The game screen is where all game play action takes place. Items on the game screen should, if supported, include most or all of the following: the player's avatar (graphical online persona), opponents'/teammates' avatars and Matrices, Receiving Queue, Target Mark, Chat Window (whether a separate window or integrated), Chat Bubbles next to opponents'/teammates' avatars, Timer, and other Tetris interface conventions such as the Hold and Next Queues, etc.

1: Player's Matrix	4: Opponent's Matrix	7: Player's Target Mark
2: Player's Receiving Queue	5: Opponent's Receiving Queue	
3: Player's Chat Window	6: Player's Avatar	

14. TETRIS GLOSSARY

Back-to-Back: *adj.* describes two major bonus actions, such as two Tetris, performed without a Single, Double, or Triple Line Clear occurring between them.

Block: *n.* a single block locked in a cell in the Matrix. Also known as an existing Block.

Block Out: *n.* the Game Over Condition that occurs when part of a newly-generated Tetrimino is blocked due to an existing Block in the Matrix.

Broken Line: *n.* any line sent to opponents with only one gap in the row. In the typical Multiplayer Tetris variant, Broken Lines are clearable and have just one gap in a random location.

Buffer Zone: *n.* a 10-cell wide x 20-cell high invisible area above the Matrix used to detect Lock Out, Block Out, and Top Out Game Over Conditions.

Collapse: *v.* all Locked Down Blocks above the Line Clear fall vertically by the same number of rows as the number of lines that were cleared.

Counter Attack: *n.* an attack against an opponent's Line Attacks to prevent lines from appearing in one's own Matrix. Before any lines from an action can be sent to an opponent, one's own Receiving Queue must first be cleared.

Facing: *n.* each Tetrimino has four facings: North, East, South, and West. All Tetriminos appear in the Next and Hold Queue, and are generated, in their North Facings.

Fall Speed: *n.* the speed at which a Tetrimino descends from the top of the Matrix.

Ghost Piece: *n.* a graphical representation of where the Tetrimino in play will come to rest if it is dropped from its current position. Appears as an outline or translucent image. Begins North Facing at generation.

Goal: *n.* the condition that must be met before a Level Up (or Game Completed) takes place, and is typically a number of lines left to be cleared. The Goal depends on the goal system used. For the Fixed Goal System, 10 lines must be cleared on each level. For the Variable Goal System, the player must clear 5 lines at level 1, 10 lines at level 2, and so on. Each level adds an additional five lines to the Goal.

Hard Drop: *n,v.* causes the Tetrimino in play to drop straight down instantly from its current location and Lock Down on the first Surface it lands on. It does not allow for further player manipulation of the Tetrimino in play.

Tetris® Design Guideline

March, 2009

Hold Queue: *n.* the storage place where players can Hold any falling Tetrimino for use later. When called for, the held Tetrimino swaps places with the currently falling Tetrimino, and begins falling again at the generation point.

Level Up: *n.* upon completion of a level's Goal, the player proceeds to the next level.

Line: *n.* the result when Blocks fill a horizontal line of cells in the Matrix.

Line Attack: *n.* this attack sends Broken or Solid Lines of Blocks to opponents (at random or user targeted times, depending on the system used), and can be performed using these actions: Doubles, Triples, Tetrises, T-Spin Singles, T-Spin Doubles, and T-Spin Triples.

Line Clear: *n.* when a horizontal row is completely filled with Blocks, it is removed from the Matrix and is called a Line Clear. All pieces above the Line Clear shift down to fill the space. Most Tetris variations award scoring or other bonuses for the number of lines cleared at one time. These are known as "Line Clear Bonuses". There are eight types of Line Clears:

Single: the player clears one line.

Double: the player clears two lines.

Triple: the player clears three lines.

Tetris: the player clears four lines.

Mini T-Spin Single: the player clears one line by achieving an easier T-Spin.

T-Spin Single: the player clears one line by achieving a T-Spin.

T-Spin Double: the player clears two lines by achieving a T-Spin.

T-Spin Triple: the player clears three lines by achieving a T-Spin.

Lock Down: *n.* the point at which a Tetrimino in play can no longer be manipulated by the player. This generally occurs 0.5 seconds after a Tetrimino lands on a Surface.

Lock Down Timer: *n.* counts down from 0.5 seconds once the Tetrimino in play lands on a Surface. When this time expires, the Tetrimino Locks Down and can no longer be manipulated by the player. The Lock Down Timer resets according to Classic or Infinite Placement Lock Down Rules.

Lock Out: *n.* the Game Over Condition occurring when a Tetrimino Locks Down completely above the Skyline.

Matrix (may-trix): *n.* the rectangular arrangement of cells creating the active game area, usually 10 columns wide by 20 rows high. Tetriminos fall from the top-middle just above the Skyline (off-screen) to the bottom.

Mino (mee-noh): *n.* a single square-shaped building block of a shape called a Tetrimino. Four Minos arranged into any of their various connected patterns is known as a Tetrimino.

Next Queue: *n.* displays the Next Tetrimino(s) to be placed (generated) just above the Matrix. If hardware permits, the next six Tetriminos should be shown.

Next Tetrimino: *n.* the next Tetrimino that will be placed (generated) just above the Matrix.

Piece Edges: *n.* the edges, or boundary, of a single Tetrimino.

Receiving Queue: *n.* a vertical meter that accrues opponents' Line Attacks between Lock Downs. When a Lock Down occurs, any lines accrued in the meter are added to the bottom of that player's Matrix before generation of the Next Tetrimino.

Rotation: *n.* the method by which the player changes the facing of a Tetrimino. Rotation occurs at 90 degree intervals, and can be performed in both the clockwise or counterclockwise directions.

Skyline: *n.* the horizontal line at the top of the Matrix. Tetriminos fall from the middle of the Matrix just above the Skyline.

Soft Drop: *n,v.* causes the Tetrimino to drop at an accelerated rate (20x the normal Fall Speed) from its current location.

Solid Line: *n.* a row of Blocks without any gaps sent to one or more opposing players.

Starting Lines: *n.* any rows of Broken or Solid Lines at the beginning of a game. Typically, variants may use different preset or random patterns to mix up game play during a Multiplayer session.

Surface: *n.* the top of any Block in the Matrix, or the bottom of the Matrix floor.

Super Rotation System: *n.* the system devised to enable the rotation of a Tetrimino regardless of where it is in the Matrix.

Tetris® Design Guideline

March, 2009

Target Mark: *n.* a movable marker that designates the recipient of a Line Attack. This marker displays near the middle of the opponent's Matrix but is only visible to the player that controls it.

Tetriminos (tetri-mee-nohs): *n.* geometric Tetris® shape formed by four Minos connected along their sides. A total of seven possible Tetriminos can be made using four Minos, each represented by a unique color.



O-Tetrimino: yellow; a square shape; four blocks in a 2x2 square.

I-Tetrimino: light blue; shaped like a capital I; four blocks in a straight line.

T-Tetrimino: purple; shaped like a capital T; a row of three blocks with one added above the center.

L-Tetrimino: orange; shaped like a capital L; a row of three blocks with one added above the right side.

J-Tetrimino: dark blue; shaped like a capital J; a row of three blocks with one added above the left side.

S-Tetrimino: green; shaped like a capital S; two stacked horizontal dominoes with the top one offset to the right.

Z-Tetrimino: red; shaped like a capital Z; two stacked horizontal dominoes with the top one offset to the left.

Tetris Engine: *n.* the code that controls the logic of a Tetris game.

Top Out: *n.* the Game Over Condition occurring when the player receiving New Blocks Lines forces that player's existing Blocks to reach to the top of the Buffer Zone and past the Top Out Line.

Top Out Line: *n.* the ceiling of the Buffer Zone, 20 rows above the Skyline. This is the absolute topmost line in Tetris.

Touch: *n. v.* when a Tetrimino comes in contact with one of the Matrix walls or Blocks in the Matrix.

T-Slot: *n.* any Block formation such that when the T-Tetrimino is spun into it, any three of the four cells diagonally adjacent to the center of the T-Tetrimino are occupied by existing Blocks.

T-Spin: *n.* this action can be achieved by first landing a T-Tetrimino, and before it Locks Down, rotating it in a T-Slot.

Visual Rotation Point: *n.* using the Super Rotation System, this is the point anywhere near or within the Tetrimino around which the engine attempts to rotate the Tetrimino. If unsuccessful, it will attempt to use the next Visual Rotation Point of the Tetrimino until it is successful.

Well: *n.* a vertical gap between Blocks in the Matrix. A perfect one-cell wide by four-cell tall Well is the precursor to a Tetris.

