

# Crosswinds

## Game Design Document

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### \*. *Brainstorming*

#### *A. Mechanics & Game Rules*

- \*.A.1 Odd number of board spaces. (As talked about in class, so that the token would always start in the same center square)
- \*.A.2 Time limit on a player's turn.
- \*.A.3 Multiple levels increasing in difficulty.
  - \*.A.3.1 Would help the player develop strategy.
  - \*.A.3.2 Easy levels  
Fewer pieces, fewer types of pieces, a smaller board, and a longer time limit on each turn.
  - \*.A.3.3 Hard levels  
More game pieces from which to choose, shorter time limit, items/power-ups.

For example, an item on the board could give a player more pieces. Complicates decision-making process, requiring more strategy.

**\*.A.5** Starting player is selected at random, based on the random initial direction of the token (opposite I believe right?). [The winner of a round will be the starting player in the following round?] {I think the starting player should always be based on the direction of the token which is chosen randomly each round  
Brandon Kelch}

**\*.A.6** Shared pieces

Display all the pieces on the board somewhere, and have each player pick a piece from that set on their turn.

## *B. Visuals & Themes*

**\*.B.7** Animated movement of the game token

**\*.B.8** Boat Theme

A sailboat would replace the token, and would move across an ocean background. A flag in the top left shows which way the “wind” is blowing (direction boat moves). There is a center island which the boat takes off from at the start of the game. The block pieces are buoys which guide the boat in the right direction (which the player specifies). Perhaps tropical music and light tonal effects would be appropriate.

**\*.B.9** Gravity

The direction the token is moving is always down and the board rotates accordingly. The token is attached to some sort of string while the player is placing his piece so that he can see how far it will “move”. Game pieces are represented by a pulley system which changes the string and token’s movement. Probably a techno beat would fit the tone and factory sound effects.

**\*.B.10** Ranch

Another theme could have the game board set on a ranch. The token is represented by a cow and the players try to “corral” the cow into their own barn. When you get three cows you win! The game pieces could be grass patches or small fencing or something.

## *C. Possible Titles*

**\*.C.11** Tumble - for the gravity-themed game

## ***0. Overview***

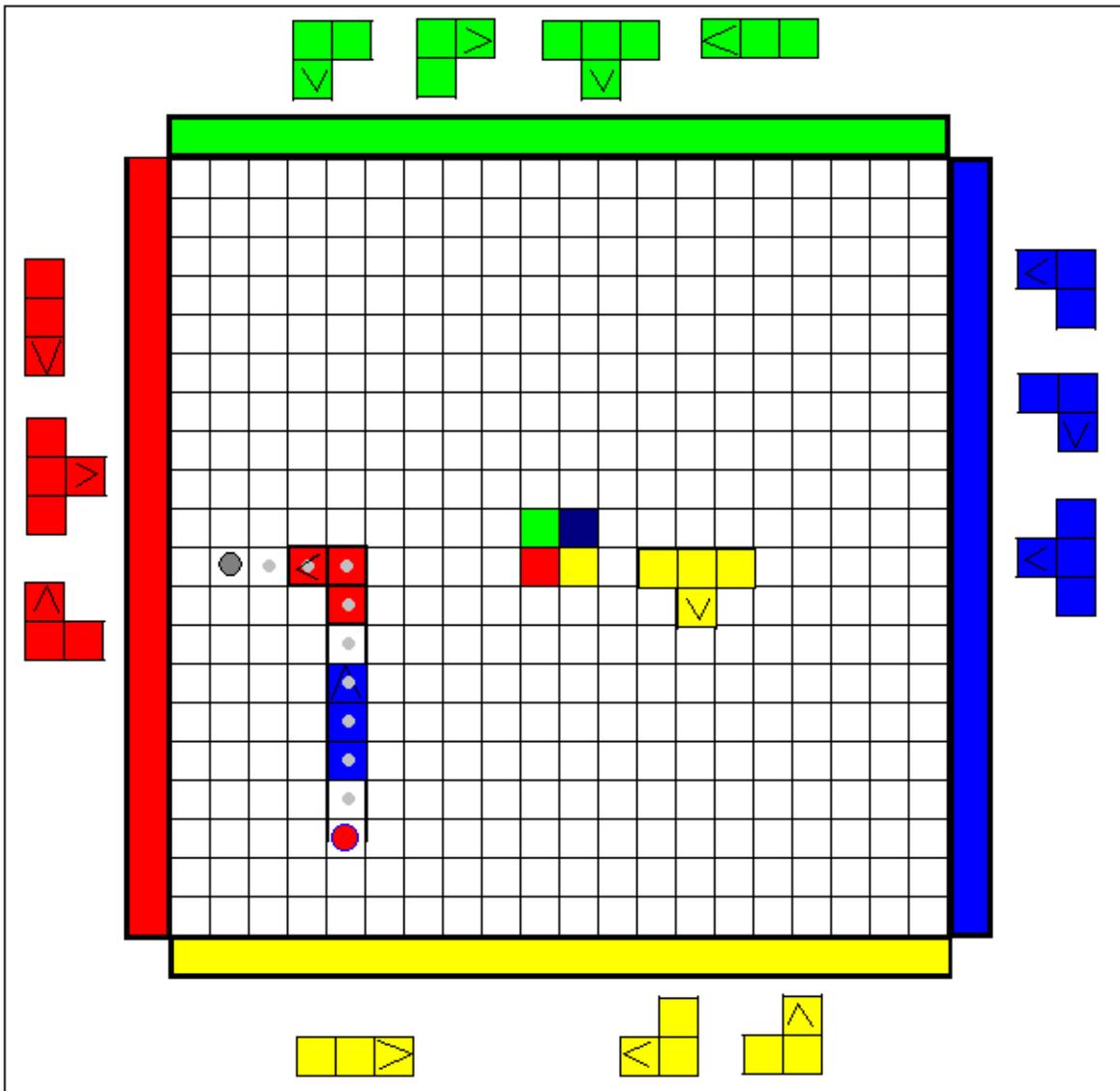
(Timothy Jones)

Crosswinds is a four player board game in which players can place or remove pieces from the playfield in order to direct a token into their goal to score points and ultimately win.

The token, at the beginning of the game, starts in the center of the board and is given a direction in which it will move. The game is made up of turns in which the active player may place their own game piece on the board or remove any piece that is already on the board. After the player has finalized their move then the token moves in its initial direction but may change its course depending on the pieces that have been layed out on the board. Then control of the board goes to the player who is to the left of the active player (clockwise rotation). On every subsequent turn the amount of spaces that the token moves increases by one thus making it harder and harder to control the movement of the token and increasing the chance that a player will score. Once the token enters a players goal, that player scores a point and the round starts again. All the pieces that were on the board stay on the board, however the token is placed in the center of the board and its speed is reset to the initial amount. Play then continues until a player wins 3 rounds and is proclaimed winner of the entire game.

Crosswinds was inspired by a board game called Standoff designed and tested by Timothy Jones and Mario Sanchez at USC in CTIN 488 Game Design Workshop at USC fall semester 2006.

**View Of Gameboard and Example of Token Animation** (Gary Mgerian)



Description: The red circle which is at the lower left side of the board represents the token. The red color of the token signifies that it is the "Red Players" turn. When it is the "Green Players" turn, the color of the token would change to green. The players would be able to know whose turn it is by simply looking at the color of the token. The small gray circles signify the path the token will take if the player was to choose this move. The larger and darker gray circle symbolises where the token will end up.

This is view that the player with the yellow goal will see in 2D.

There could also potentially be a place on the board where the score, timer, and round number, etc will be displayed.

## 1. Game Progression (narratives)

### 1.1 "First 60 seconds of play" (Gary Mgerian)

Note: Depending on how we implement the game, there could be different ways in which a player is first seated, or has the option of choosing a color. For instance, as far as seating goes, we could possibly have a list of current games taking place from which the user could choose one with an open seat and begin. Or we could just have the system automatically place the player onto a current game with an open seat.

Assuming that all players are seated and the game begins at the same time for everyone, the first 60

seconds will be as follows:

The player will first see the board and rest of the game elements. The users will be notified that the game is about to begin by either seeing some message, animation, or basically through observing some type of change. The token will appear on the appropriate color at the center of the screen. Then the player who will start the game off will be notified. The place holder for the direction (which will be determined randomly by the system at the beginning of the game) will adjust accordingly, and the number of moves the player is going to take will be visible to all. The first person will choose a game piece and place it on the board, moving it and adjusting it to begin the play. Once the first player has determined where they are going to place there direction piece and committed to it, all of the players will observe the as the token is moved to its new location. Once the token is at its new location, the place holder for the direction of the token will shift one over, the number of steps which a player will move the token will increase by one, and the next player will begin their turn.

<Are we still going to have a "placeholder piece"? I thought we were just going to have the current direction be displayed in the HUD?(Charlene)>

## 1.2 "When its your turn" (Gary Mgerian)

Another player has just finished their turn, and your turn has just began. There is an indicator to show which way the token is moving as dictated by the previous player's piece placement. You might then glance to see how many steps you can move the token and begin to think about what direction pieces you should use.

By using the keyboard/game controller you pick a desired piece and place it on the board and move it to your desired location and then look to see (through the animated path) where the token will end up if you place it on that piece spot. You look at the block where the token will end up on based on the direction piece you just chose, and either move the game piece to another location, rotate it, or choose another direction piece which will benefit you the most. Once a decision has been made, you proceed to press the "Commit Move" button to move the token and finalize your move.

<should this go in a different section?> ... **Answer:** When I was writing section 1.2 ("When its your turn"), I added this part to describe how a players turn will play out when there is a time limit. Meaning this is still part of 1.2.

**Time Limit** (In the case that we have a time limit for each turn.) (Gary Mgerian)

As soon as the player before you finished, and it becomes your turn, there would be some type of counter showing the amount of time you have to commit to a move. In the case that you do not press the "commit button" within the time limit, your turn will simply be skipped.

When you are down to your last seconds the game should warn you somehow by either turning the clock red, increasing its side, flashing, etc.

## 1.3 "The previous player's turn" (Noel Overkamp)

A change in the state of the GUI alerts the user that the active player has changed. During this time the board will remain static from the perspective of the passive players. The user will at this time be able to plan ahead and chat with the other players. They will be unable to interact with the board or the pieces. Eventually an animation will alert the user that the player on their "left" has moved. The user will be able to clearly understand whether a piece was placed, moved, or removed based on the animation. Then the token will go through its animation for all players. Once the token has traversed its path the system will show the user that their turn has begun.

### **Should the timer for other players' turns be displayed?**

I think so. It would be more exciting for everyone to countdown with the timer and hope that possibly their opponent does not get a move off in time. (Brandon Kelch)

## 1.4 "The last turn of a round" (Charlene Jeune)

During their turn, a player has managed to move the token into their goal by either placing, moving, or removing a game piece. A round win animation or message is displayed to the winning player, and a "Round #\_\_ Over" animation or message and the name of the winner is displayed to the other players. The scoreboard section of each player's HUD is updated to indicate the winning player's win. The token is reset to

a new random starting position, the speed is set back to 4 spaces, and a new direction is selected at random. The game pieces are not cleared from the board. The winner of the last round is allowed to go first.

### 1.5 "The last turn of the game" (Charlene Jeune)

During their turn, a player that has previously won two rounds manages to move the token into their goal once again, by either placing, moving, or removing a game piece. A game win animation or message is displayed to the winning player, and a "Round #\_\_ Over/Game Over" animation or message and the name of the winner is displayed to the other players. The scoreboard section of each player's HUD is updated to indicate the winning player's win. The players are each given the options of either playing again or quitting the game. If a player decides to play again, he can choose to play again with remaining people from the previous game or to join another group. If he decides to quit, the player will be asked for confirmation of his decision, and if confirmed, the game will close.

## 2. *Game Mechanics*

### 2.1 Objective

- There are 4 different goals, one along each side of the board.
- The objective of each player is to move the token into their own goal, which scores one point. After a point is scored, a new round is played.
- The first to score three points wins the game.

### 2.2 Players

- The game can be played by 2-4 players.
- Teams of two are allowed.
- Each player/team has their own color, and their goal and game pieces of that color.

### 2.3 Directional Pieces

- Each player is given a set of 5 game pieces that may be placed on the board.
- The game pieces on the board are used to manipulate the path of the token. The arrow indicates where the token exits the piece and which direction it subsequently travels in.
- The arrow of a game piece must be at least one square block away from any colored block (goals and center blocks).
- The game pieces may not overlap.

### 2.4 Token

- There are 4 possible starting locations at the center of the board from which the token will start. (The starting location will be chosen randomly at beginning of each round).
- The initial direction of the token at the start of the game will be chosen randomly.
- The token is moved a certain number of spaces each turn. It starts with an initial speed of four, but increases by one at the end of every turn. If the maximum speed of twenty is reached, the speed remains at twenty for the remainder of the round.
- At the end of each round, the speed is reset to four and token restarts at one of the four starting locations. The pieces are not cleared from the board between rounds.

## 2.5 Turn Structure

### 2.5.1 Actions Available

On their turn, a player may perform one of the following actions:

- Set a piece
- Remove a piece
- Change the position of a piece
- Do nothing

### 2.5.2 Setting a Piece

To set a piece, the player must select one of his pieces and a semi-transparent version of it will appear on the board. Using certain buttons of the controller, the piece can be rotated and moved around the board. A button must be pressed to finalize its placement on the board. However, if the piece has been placed in a way such that it violates a rule, the finalization will not take place and the player will be notified of their mistake.

### 2.5.3 Removing a Piece

To remove a piece the player has to select the piece from the board and move it off the board. Once off the board the piece will automatically be placed back in its owner's bank.

### 2.5.4 Changing the Position of a Piece

To change the position of a piece, the player has to select it and then will be able to do the same procedure from that point as is done for placing a new piece.

### 2.5.5 Turn Finalization

- "Shadow token" shows the projected movement of the token based on current pieces.
- There should be some button which a player must press to finalize their move. If they do not press the button within a given amount of time during their turn, then their turn will be skipped.
- When you are down to your last seconds the game should warn you somehow by either turning the clock red, increasing its size, flashing, etc.

### 2.5.6 Turn Resolution

- Once the action has been finalized, the token will move along the path that has been laid out for it.
- If during a move, the token touches the same piece twice, the piece is automatically deleted before the token continues to move.
- After a player performs one of the above actions, their turn is over and play continues in a clockwise direction.

### ***3. Artificial Intelligence***

#### **3.1 Path Highlighting**

During a player's turn, the potential path of the token is highlighted while the player hovers a piece over the board. This function simply eliminates guesswork. If the player is setting or moving a piece, the path will change as well if the current position of the piece affects it.

The known variables are the initial direction of the token and the number of steps to be taken. Given this information, it should be easy to calculate the successive steps each time a piece hovers over a new grid space.

The event that triggers the calculation could in fact be when a hovering piece slides into a new grid space. There will be a discrete number of events. If a piece has width and height, and the game board has dimensions  $m \times n$ , the number of moves is  $(m - \text{ceil}(\text{width}/2)) * (n - \text{ceil}(\text{height}/2))$ . For example, if a piece has width=3 and height=2, and the game board is a 7x5 grid, the number of possible events that could trigger a potential-path refresh is 5x4, or 20. Fifteen of thirty-five events are impossible due to the shape of the piece.

This doesn't account for the restriction of arrows not being able to touch colored blocks. A few conditional statements within the 'magnetic snapping' function could fix that.

#### **3.2 Computer Opponents**

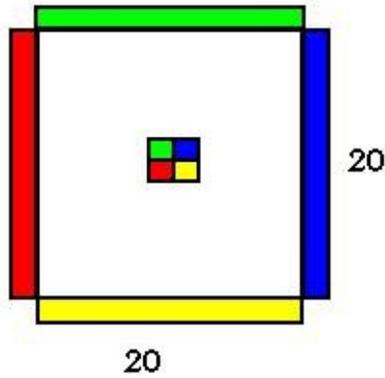
Path calculation in this case isn't quite the same as path-finding AI. In order to exercise some AI programming, we could incorporate AI players. Depending on how much time we have and how we delegate certain tasks to certain people, our AI goals could be tiered as such:

- Simplest AI. In this form, the AI players seek the most direct move that would help them in the short term. This AI player does not strategize.
- Advanced AI. The AI player seeks the best possible path considering the pieces currently on the board and calculations of subsequent moves by other players. Tries to plan ahead like a person would, rather than choosing the path with the highest short term benefit.

### ***4. Game Elements***

#### **4.1 Game Board**

- The game board, consisting of a playing area and four goals.
- The dimensions of the playing area are 20 x 20 grid spaces.
- On each side of the main playing area is a 1x20 goal area in one of four colors: red, blue, green, and yellow.
- In play, the four colors represent the four players/teams.
- Once the token moves into one of the four goals the round is restarted and the token is removed from the board.
- In the middle of the board are four squares that are the four game colors. They are the four possible starting squares for the token. All other squares in the main playing area are white.



#### 4.2 Token

- In each turn the token is moved a certain number of spaces according to the current number of spaces to be moved.
- Its initial movement in each turn is dictated by the current direction indicated on the HUD.
- The direction in which it is going by the end of the turn is recorded as the new initial direction for the token in the next turn.

#### 4.3 Game Pieces

- Each player is given 5 game pieces that match their team's color.
- During a player's/team's turn, they can add, move, or remove one of their own pieces or remove an opponent's piece from the board.
- A piece consists of three or four squares that are of the same size as those of the board.
- There are four different shapes that the pieces can be: a "T"-shape (4 squares), 2 different "L"-shapes (three squares), and a column (three squares).
  - Piece design



- Every piece has an arrow on one of its squares.
- When the token is traversing a piece, it takes the shortest path through the piece's squares towards the arrow.
- When exiting the piece it moves to the adjacent empty space that is pointed to by the arrow.
- Game pieces cannot be placed overlapping each other or overlapping a goal or starting point.
- In addition, the arrow cannot be adjacent to a goal or starting point.

#### 4.4 HUD

- The HUD, or Heads-Up Display contains important game state information.
  - Number of spaces the token will move
  - The player whose turn it currently is
  - The current direction of the token
- The HUD could also display an inventory of pieces - with a small replica of the piece type and a number indicating how many of that type available.

- The HUD could either take up its own space, or be semi-transparent and float over the other elements. Alternatively, the HUD could have various graphical states in which its visibility can be toggled in some fashion.

#### 4.5 Chatbox

- In the chatbox, player's can talk to each other during play. The text from each person could be color-coded to their player color in the game.

#### 4.6 Scoreboard

- The score for each player/team should be displayed someplace on the board where it is visible to everyone.

#### 4.7 Could the scoreboard possibly be contained in the HUD? (Charlene)

### 5. *Graphics*

#### 5.1 Dimensions

Everything is being rendered in 3D, but all the objects are currently 2-dimensional.

#### 5.2 Motion & Particle Effects

- The token could have trails.
- If the token bounces at all, it could produce small tremors and shake the screen slightly.
- Each time the token passes through an arrow, some snazzy particle effects could be generated. (Subtle things, like colored sparks that match the color of the piece for example).
- The token's path will have some kind of animated effect

### 6. *User Interface*

#### 6.1 Chat Box

The implementation of the chat box follows the chat style of many online games. The players can touch a key on the keyboard, indicating his/her desire to write a message. When this key is pressed, an input box will appear with space to write the message. Private messages should be allowed (to perhaps plot against other players or to establish team activity). A command that precedes the actual text to indicate the recipient of the message. Furthermore, in order to prevent accidental transmission of a private message (due to a typo) to the public chat box, a list of players are available on the side. When these names are clicked, the correct prefix (to send a message to this player privately) appears in the chat box. After a message is typed and sent,

the input box will disappear. However, the main chat window with previous messages remain static on the screen. Private messages should be displayed in the same chat window, but should perhaps be highlighted or written in a different color. A player should be able to close the chat window if he/she prefers.

**<is the location of the chat box going to be on the HUD?> -roger**

## 6.2 Piece Container

The piece container should be located to the side of the game board. The pieces can then be dragged out and placed on the board or dragged back inside when necessary.

**<just an idea: in order to save room, maybe the piece container and pieces can be really small on the side of the screen. Only when pieces are dragged outside, they become full size in order to go on the board. what do you guys think?> -roger**

## 6.3 HUD

Contents of the HUD are stated above. The user can control the amount of information displayed by the HUD by expanding/collapsing each individual section.

# 7. Audio

## 7.1 Background Music (Gary Mgerian)

There will be music playing the background as the game is played. There could be two possible implementations of this. One possibility is to have all players listen to the same music without it being effected by the game. Another possible implementation, as talked about in class, is to have the music be influenced by the game. For instance, as the timer winds down on a players turn, the music will begin to get faster and faster as each second passes. The increase in the speed of the music could either be changed only for the player playing the turn, or for all players regardless of whose turn it is.

## 7.2 Sound Effects

### 7.2.1 Event List

- Game piece is placed on board
- Game piece is removed from board
- Game piece is moved by one square
- Game piece is rotated
- Player places game piece in violation of a rule
- Token moves one square while in empty play area
- Token moves one square while on a piece
- Piece disappears as a result of a loop
- Another player adds a line to chatbox
- Turn time limit expires (if there is a time limit)
- Player/team wins round
- Player/team loses round
- Player/team wins game
- Player/team loses game
- Scroll up/down (If there are menu screens. Two different sounds.)
- A player quits the game.
- Player Joins Game

- Player breaks a rule
- Player Commits Move
- Piece gets deleted from the board (in the case that the token hits a piece twice within one move).

### 7.2.2 Themed Sound Effect Ideas

- Boat/Ocean Theme
  - Whenever the direction changes, there could be a whoosh of wind
  - Sail flapping in the wind (along with the sail visibly being hit with wind from a different direction), or a flag on an island showing the direction flapping in the wind.
  - Boat moving through the water
  - Boat floating in water when at rest.
- Ball/Gravity
  - When the board turns have the sound of cogs turning (very industrial)
  - When the ball falls have a rolling sound
  - When a player finalizes their turn have a whistle sound

### **Keyboard Input/Game Controller** (Gary Mgerian)

The user will interact with the game through the keyboard. All of the desired moves and selections are made by inputting designated keys which perform commands such as commit move, select piece, quit game, etc.

<b>COMMAND</b>	<b>KEY(S)</b>
Commit	c, "Enter"
Unselect	u
Select Next Piece (iterate through the pieces)	'f' or '>', 'n'
Select Previous Piece (iterate though the pieces)	'd' or '<', 'm'
Translate	arrow keys (up,down,left,right)
Rotate clockwise	r
Rotate counterclockwise	e
Remove a piece	R
Quit	q

*The Commands for the Game Controller are as follows:*

<b>COMMAND</b>	<b>KEY(S)</b>
Commit	'O'
Unselect	'^' (triangle button)
Select Next Piece (iterate through the pieces)	'R2'
Select Previous Piece (iterate though the pieces)	'R1'
Translate	arrow keys (up,down,left,right)
Rotate clockwise	'X'
Remove a piece	'□' ("square button")

Save