1 GAME CONCEPTS

1.1 Game Goals

- Bring a feeling of an ice rink to the Palm screen.

- Build competitive gameplay through decent AI and sleek player-to-player mode.

1.2 References

- 1985
Xeno (Commodore)
Publisher: A&F Software

- 1986
Xeno (ZX)
Publisher: A&F Software
Producer: Binary Design
Re-released: Quicksilva Ltd. (1986), Bug-Byte Software Ltd. (1986), Grandslam Entertainments Ltd. (1986)

- 2002
Xeno 2002 (PC/Win, freeware)
Author: Colin McGregor (www.bankie.com)

Ultimate Table Hockey (Palm OS)

Air Hockey 3D (Palm OS)

2   GAME FLOW

XENO starts with the start-up screen featuring game specials. Player makes a single tap to move to Game Settings.

Game Settings:
- *Red: Computer/Human   Blue: Computer/Human*
- *Difficulty: Easy/Average/Hard (2nd priority)*
- *Period Length: 2 min/4 min/6 min/8 min/10 min*
- *Push Time 0/1 sec/2 sec/3 sec/4 sec/5 sec/∞*
- *Preferences*
    - *Friction   Low - - - - = - - High (2nd priority)*
    - *Animation   On/Off (2nd priority)*
[GO   ]

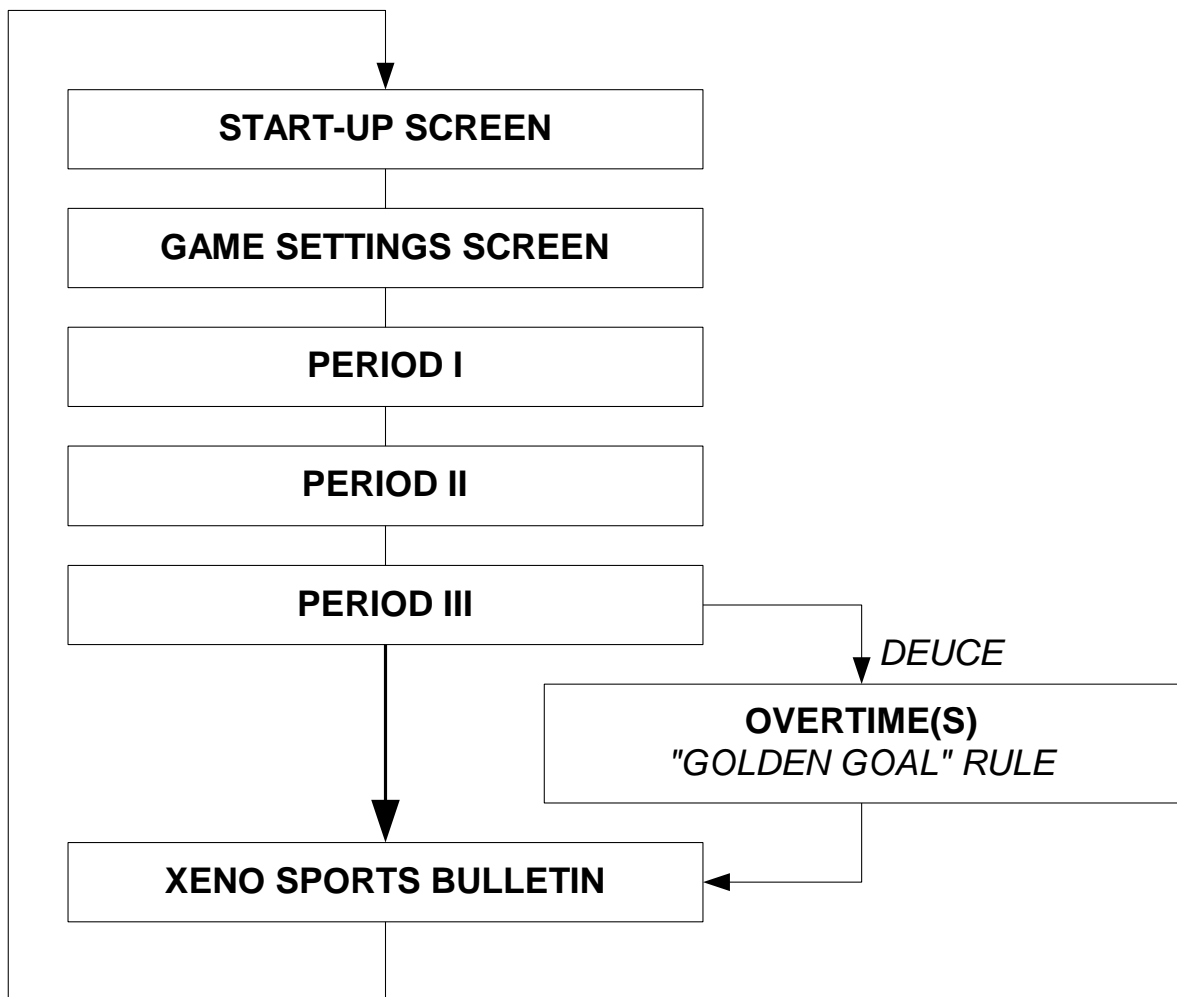The match consists of 3 periods and overtime(s), if necessary.

Player can easily interrupt the game by tapping System button. In this case application saves current game status. When player returns to game by re-launching application, there's a *PAUSE* message overriding static picture of the rink action. Player makes a single tap to return to game.

To quit game, player calls Menu and taps Quit Game. This takes him to startup screen.

Game
     Quit Game

When the match is over, "XENO Sports Bulletin" is on display covering match score, hot streaks, records and other useful info. *(2nd priority)*

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        │    GAME SETTINGS SCREEN      │
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                      │              │        OVERTIME(S)            │
                      │              │    "GOLDEN GOAL" RULE         │
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START-UP SCREEN

GAME SETTINGS SCREEN

PERIOD I

PERIOD II

PERIOD III

DEUCE

OVERTIME(S)
"GOLDEN GOAL" RULE

XENO SPORTS BULLETIN

3 GAME MODES

SINGLE PLAYER MODE – CPU Player (AI) and Human player compete on the rink.

DEMO MODE – Two CPU players compete on the rink. *(2nd priority)*

PLAYER-TO-PLAYER MODE – Two Human players compete on the rink through IrDA connection.

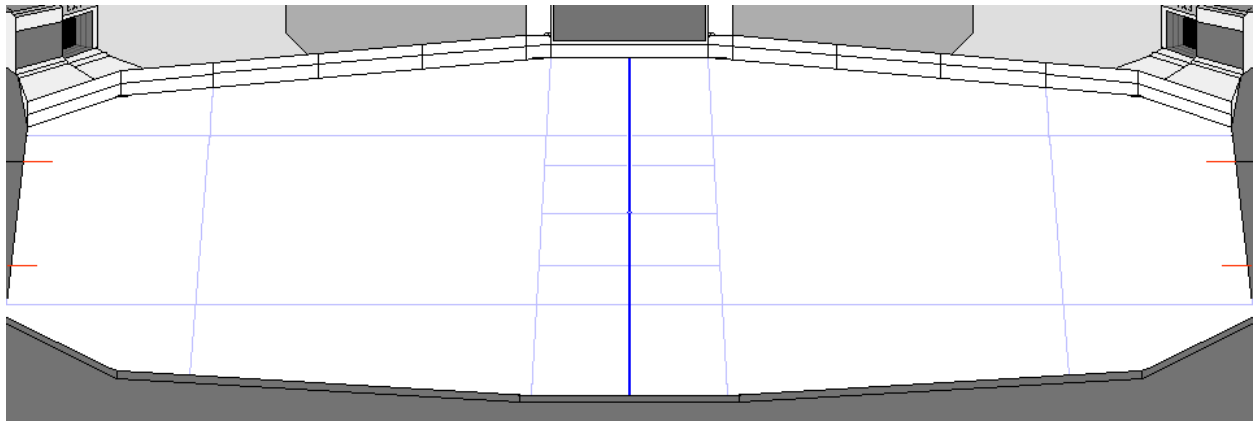# 4 CHARACTERS

4.1 Characters

- Xeno disk

4.2 Objects

- Puck

5 WORLD / ENVIRONMENT / LEVELS

5.1 Structure & Scope

- Ice rink

Side view is implemented. Camera is above rink. Only some part or rink (1/3 nearly) can be seen at one moment. Camera can scroll left and right.

Overall rink view.

5.2 World Interaction

Xeno features realistic and impressive game physics. Ice rink is characterized with a certain level of friction to make puck and xeno disk movements realistic. They bounce off when they hit boards or each other.

Game physics is a model of colliding objects moving on ice. There must be observable slide and collide effect.

Movement of the puck after collision with xeno disc depends on what part of disc a hit was made. Player should target precisely to push puck right in the preferred direction. Goal cross-bars and rink boards can be used to deliver puck to opponent goal by indirect hit.

6 GAMEPLAY

6.1 Control

Intuitive control of the push using stylus has place in the game. To target his disk, player moves the cross along the rink. To make a push, he just releases stylus. Position of the cross at this certain moment sets the *direction* of the push. Length of the push line (from the xeno disk to the puck) sets its *strength*. Possible position of the cross is limited to rink boards and current screen.

6.2 AI

The main concept of game AI is to use different tactics in different situations during the match. According to absolute and relative positions of the puck and xeno discs on the rink, match score, time and other parameters CPU player behaves in certain manners. Further we will call them "tactics".

Tactics falls into two following categories: offensive and defensive. The goal of offensive tactics is to attack opponent's goals. Opposite to that, defensive tactics is targeted to prevent human player attempts.

Types of offensive tactics:
- Hit'n'Run
- Bordering
- Middlefield
- Pressing

Types of defensive tactics:
- Ejection
- Tackling
- Goalkeeping
- Time consuming
- Defensive Pressing

Tactics Overview

In this section we describe when different tactics have place and how the CPU behaves.

1. Hit'n'Run

This is the simplest offensive tactics. CPU player will push puck towards human player goals. If position does not allow doing that, e.g. CPU disc is to the right of player goals and the puck is also to the right, then CPU player moves disc into position that allows to hit puck in the necessary direction. No defensive action is taken.

This tactics can be executed when puck is positioned in the middle field (central part of the rink) or in the offensive side of rink (close to opponent's goals).

2. Bordering

This offensive tactics heavily relies on the rink configuration and makes efforts to fake human player. CPU tries to score with trick shots. The puck will be hit in such a way that it reflects by borders of rink and is directed to player goals. This must be accompanied by feint: during the first half of push time CPU aims to emulate fake shot (e.g. straight hit into goals), that player will possibly try to counter. Then CPU rearranges his shot to perform reflection shot to score.

This tactics can be executed when puck is positioned in the offensive side and player disc is between player goals and the puck.

3. Middlefield

This offensive tactics is dictating CPU player to stay in the center of the field in such a way that human player can't see CPU disc that is out of camera view. When player tries to eject puck from his defensive side, CPU counters puck with a single strong hit that delivers puck to goals. Player must be surprised by this hit.

This tactics can be executed when puck and human player discs are positioned in the offensive side. CPU player disc should be on the defensive side or in the middle field. Also, there should be a draw state of the match or CPU lead against player.

4. Pressing

This offensive tactics is based on the trick that is used in many team sports. CPU player should behave as a pesky dog and try to stick to human player disc. He must be in close vicinity to player but between player disc and CPU goals. Such position will give a good chance to counter player hit and push puck in the direction of player goals.

This tactics can be executed when puck and human player disc are positioned in the offensive side. CPU player disc should be on the defensive side or in the middle field. Also, there should be a draw state of the match or CPU loosing against player by 2+ (e.g. zero to two or one to four). Also, time to the end of the match (or period) is important factor. In real sports pressing tactics is often used in the ending of game intervals.

5. Ejection

This is the simplest defensive tactics. CPU player pushes puck outward his goals. Best result is when puck is evacuated from defensive side of the rink (part of the field there CPU player goals are) to the middle field or to the offensive side. In some situations similar to Hit'n'Run tactics CPU player beforehand must move his disc into right position to accomplish this.

This tactics can be executed when puck is positioned in the defensive side.

6. Tackling

This defensive tactics is a bright example of counter trick. When human player tries to attack CPU goals then CPU player must throw his disc quickly to send puck back to the middle field or even to the offensive side.

This tactics can be executed when CPU player disc is positioned in the defensive side and human player is in the middle field, and the puck is between both discs. Range between discs must be greater then two or three sizes of xeno disc (because super reaction for CPU won't be fair).

7. Goalkeeping

This defensive tactics dictates CPU player to stay in close vicinity to his goals to make saves. By this, human player chances to score decrease greatly. "Save" means such a movement of the disc that will reflect puck sliding right to the goals. Even when reflected puck stays in the defensive side, CPU is near his goals anyway.

This tactics can be executed when CPU player has big advantage in score. CPU disc must be positioned in the defensive side.

8. Time consuming

This defensive tactics means that CPU player will hit puck with very little strength and even in direction of his own goals. The idea is to put CPU player disc between puck and human player disc and by this to prevent the puck being even touched by human player. The best if it is done near borders of rink (hiding puck to the corner of the rink would be a perfect action).

This tactics can be executed in the second half of the match while CPU leads or the match is in the draw state.

9. Defensive pressing

Idea for this tactics is very similar to offensive tactics Pressing, but the goal is to push puck away from defensive side.

In each and every time moment CPU player is executing the only tactics. During iteration of game cycle he can change tactics according to the game situation. This situation is defined by next parameters.

Important game parameters:
- Position of the puck relative to field (in offensive side, in middle field, in defensive side)
- Position of the puck relative to players (between them, to the left of both, to the right of both)
- Absolute position of the puck on the field (proximity to borders, corners or goals)
- Difference in the match score
- Time spent in the match.
- AI level (the better the level of AI – the simpler tactics are used less, and advanced tactics are used more often).

Summary

AI player should have a certain level of competitive and interesting gameplay. Possible math apparatus: Finite State Machine, Fuzzy Logic techniques.

6.3   Scoring

One point is credited to the side that scores. Player with the most points by the end of the game wins. If a draw has place, then game goes to overtime(s) each 2

minutes long. "Golden goal" rule takes place in the overtime; if no goal by the end of the overtime, new overtime starts.

6.4 Flow

Match starts in the center of the rink with xeno disks placed accordingly to home/visitor goals and a puck between disks.

If the Push Time is 0, then the smartest hits first in the match. Otherwise, the Human player hits first in a Single Player mode and Player 1 hits first in P2P and Demo modes.

Further, if the Push Time is 0, then there're no turns, and the smartest hits. Otherwise, the players are taking turns. In the case Push Time is ∞, there're no time limits. Otherwise, players have limited amount of time to target their xeno disk. If the player runs out of time, the application hits automatically into the latest direction.

When the actual push is just made, the opponent is allowed to strike back; so he has a nice opportunity to intercept the puck, to change the trajectory of the push, or to prevent opponent's attempts in other ways.

After the goal is made the game returns to the initial position in the center of the rink. Player who has just missed a goal hits first.

Every new period or overtime players exchange the goals (as well as initial positions in the center of the rink).

Push Time (seconds)	Match beginning	Period / overtime beginning	During the game	After the goal
0	The smartest hits first.	The smartest hits first.	The smartest hits.	The smartest hits first.
1,2,3,4,5	a) Single Player mode – Human hits first. b) P2P and Demo modes – Player 1 hits	First hit is made in turns (PI,PIII,OII… – Human/Player 1; PII,OI… – Computer/Play	First hit is made in turns. There're time limits according to game settings.	Player who has just missed a goal hits first.

	first.	er 2).		
∞	a) Single Player mode – Human hits first. b) P2P and Demo modes – Player 1 hits first.	First hit is made in turns.	First hit is made in turns There're no time limits.	Player who has just missed a goal hits first.

7 REWARDS

7.1 Overview

Bonuses (power-ups) appear on the field occasionally. If the player collects the bonus being first to hit, then xeno disk/ball/field/goal attributes change. *(3rd priority)*

7.2 Collectibles

This is a later/optional feature. The description will follow later.

8   GRAPHICS / FX, ANIMATION

Game settings screen.

Xeno disk(s).

Puck.

- Spinning effect. *(2nd priority)*

Icy rink.

- Boards.

    o Rotating banners. *(3rd priority)*

- Goals. Home/visitor goals are colored accordingly to xeno disks: either colored goalposts or a bulb (siren).

Scoreboards.

- Main scoreboard.

- Goal scoreboard.

- Scoreboard animation - *(2nd priority)*

Fans.

- Fans animation. *(3rd priority)*

 "Drizzling" effect to distinguish the end of period. *(2nd priority)*

If the player hits a crossbar, there can be a special effect to heat up excitement *(2nd priority)*.

9 CAMERA

9.1 Gameplay camera(s)

In the very beginning of the match gameplay camera focuses on the center of the rink to show both xeno disks, the puck and the scoreboard. During the match the camera follows the puck in its movement (horizontal? screen scrolling has place) and focuses on the puck current position. In the middle of the field the puck turns to be in the very center of the screen; this is not evident if the puck stops closer to rink boundaries.

10 SOUND

This is a later/optional feature. The description will follow later. *(3rd priority)*

11 ADDITIONAL FEATURES

11.1 Rink

After the human player makes his push, the application sets the default position of the cross randomly to heat up action on the rink (*ZX Xeno, 1986*). *(2nd priority)*

Dotted push line gradually transforms into dashed line as it becomes longer (and the push is getting stronger). *(2nd priority)*

Colored triangle mark on screen boundaries shows the location of the xeno disk, if it is out of the current screen. *(2nd priority)*

The push line actually goes from the center of the disk. In this way even tapping around the xeno disk initiates a little movement.

Circle-timer appears in the corner of the screen to count time to the end of period if less then 10 seconds has left. *(2nd priority)*

11.2 Scoreboard

Main scoreboard:

- Time to the end of period

- Current score

- GOAL

- AUTOGOAL

- TIED

- 1ST PERIOD, 2ND PERIOD, 3RD PERIOD, OVERTIME, 2ND OVERTIME, GAME OVER

Goal scoreboard:

- GOAL

- CROSSBAR *matter to consider*

11.3 Xeno Sports Bulletin

The description will follow later. *(2nd priority)*

12 RISKS / PROBLEMS / CONCERNS

Graphics resolution.