



J2me release  
**For Java aware mobile devices**

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# Getting Started

## History

Hopefully someone might be able to help me with that ... The only thing I know about the game is that it was around in those golden days when calculators looked like cash registers and computers were really *digital monsters*. I searched the web, but I couldn't find anything apart from Yahoo dots, which (as far as I can see) is a completely different game.

## Requirements

This implementation is designed to suit any J2ME compatible device with at least 50K memory for a MIDlet and minimum screen size 96x64.. Though colour is an advantage, but the application supports monochrome screen as well. In particular it suits old Siemens devices (like C55) and majority of Nokia Series 30 phones (but not 6310i). With touchscreen devices (e.g. Sony Ericsson P800, Nokia Series 90, Motorola M388) you can use stylus, otherwise keypad can be used.

At a cost of this versatility the board size is limited to 4x4. This is not only a result of screen limitations. Some J2ME devices have slow CPU's where an increased board size might become a real disaster for a computer player. We might be able to come up with specific releases, where you will be able to customise board size, save game, etc, but I can't promise that to happen in the near future

## Rules

At each move a player crosses one, two, or three adjacent dots that haven't been crossed previously. A player who gets a position with only one non-crossed dot loses.

The implementation allows to modify rules in the following ways:

- *last wins*: the game continues until no available dots remain and a player who has the last move wins. it looks like this modification requires a simpler strategy than the standard rule.
- *diagonal neighbours*: according to standard rules diagonal dots are always adjacent, however you can modify the rules so that diagonal dots are never connected, or connected in case the connection line does not cross another connection line.

See [Game rules](#) for more.

## Contact Details

The application has been developed by *Michael Glickman* for Palmcrust (Australia).

The current and the only version is 1.0 released in December 2003.

*Your comments of any kind are appreciated whether or not you purchased the software.*

Application site: <http://xdots.palmcrust.com>

Company site: <http://www.palmcrust.com>

XdOts (J2ME release). User Manual

Email: [palmerust@yahoo.com](mailto:palmerust@yahoo.com)

# How to Play

## Key Names

The following key names are used in the manual

### Phone keys and T9 keypad

There are numeric keys [1] – [9], [\*], [0], and [#].

In most cases phone keys are arranged in a 3x4 rectangle referred as **T9 keypad**:

1	2	3
4	5	6
7	8	9
*	0	#

which makes it convenient to play the game.

Unfortunately some devices (Nokia 3650, Siemens SX1) have a non-T9 keypad.

### Screen buttons

Keys located below the screen. All devices have at least two screen buttons: Left and Right, some models also have a Middle screen button. Screen buttons are used for entering Commands.

Touchscreen devices usually have soft buttons at the bottom or right hand side of the screen, or Menu key to bring up the list of commands.

### Arrow keys: LEFT, RIGHT, UP, DOWN

Press a corresponding arrow key, or move joystick in appropriate direction.

### FIRE

The location of FIRE key is device specific. Here are just guidelines:

1. *Motorola, Nokia series 30 and 40* – SEND key (often with a **green** handset picture)
2. *Nokia Series 60 and compatible (incl. Siemens SX1, Sendon), Nokia Series 90* – middle of arrow pad, or joystick press
3. *Siemens (apart from SX1)* – Right screen button

In most cases [5] works identically to FIRE for this application.

## CLEAR

A key labeled as C (Nokia 7650), CLEAR, or with an eraser picture on it (Nokia 3650). If your device doesn't seem to have CLEAR key, use [0] instead.

## [A], [B], [C], [D]

Additional keys, referred as "Game Keys". Designated game keys are provided by some touchscreen device, though labels not always match, and not all four keys might be present. If game keys are not present, use commands instead.

## Introduction Screen

The game starts with an introduction screen containing application logo and *Licensed to* notice (UNREGISTERED for an unregistered copy).

Just press FIRE or [5] to start a game.

You can also press Left screen button (Right screen button on some model) to select one of the following commands:

- Preferences – show Preferences screen
- Who Plays – show Who Plays screen
- Statistics – show Statistics
- Help – show online help

## Operating Game

With a *non-touchscreen device*, you can see a pointer . Use arrow keys to move the pointer in vertical or horizontal directions. If Direction Mode is set in Preferences, you can also move the pointer vertically, horizontally or diagonally using the phone keys.

To add a dot to current move press FIRE or [5]. To complete and make a move press FIRE again for the last dot in the move.

An incomplete move can be corrected it in one of the following ways:

- Move the pointer to a non-last dot in the move and press FIRE. This will truncate the move up to the selected dot.
- Press CLEAR or [0] to remove last dot from the current move. By pressing CLEAR several times you can clear the whole move.

You can prefer *Auto-select mode*: once a move started, a dot is automatically added or removed while you move a pointer, you only need to press FIRE in order to complete the move.

With a *touchscreen device* you can hide the pointer (actually it is hidden by default) and use your stylus to pick up dots. To complete a move tap again the last dot in the move. Tapping a non-last dot in a move truncates the move, tapping a non-adjacent dot discards previously selected dot and sets up a new move containing tapped dot. To clear the whole move tap a void place on the screen. You can also enable *dragging* for move selection (see [Preferences](#)).

## Key Modes

Keys can be set up to operate in either *Direction* or *Command* modes. *Non-Pointer* mode is used when the pointer is not accessible.

### Direction mode

In *Direction Mode* phone keys are used mainly to operate the pointer, while the commands (like [Preferences](#), [Who Plays](#), etc) can be accessed through screen buttons. Direction mode is not recommended for a non-T9 keypad.

*Key actions in Direction mode:*

1 Up-Left	2 Up	3 Up-Right
4 Left	5 Add dot / Complete move	6 Right
7 Down-Left	8 Down	9 Down-Right
* Undo move	0 Reduce move	# Redo move

### Command mode

In *Command Mode* phone keys are used for entering commands, therefore arrows keys provide the only way to operate the pointer. As a result of that you can't move a pointer diagonally in a single operation. For that reason Auto-select mode is not granted when keys operate in Command mode and Diagonal Lines are enabled. See [Commands](#) action for the description of commands.

*Key actions in Command mode:*

1 Preferences	6 Redo move
2 Advise move	7 Statistics
3 Who plays	8 Help
4 Undo move	9 Exchange players
5 Add dot / Complete move	0 Reduce move

* Undo move	# Redo move
-------------	-------------

## Non-Pointer mode

Keys operate in *Non-Pointer mode* when the pointer is not accessible (e.g. pointer is hidden, demo mode, game terminated). This mode only slightly differs from Command Mode:

<b>1</b> Preferences	<b>6</b> Redo move	<b>LEFT UP</b> Undo move
<b>2</b> Advise move	<b>7</b> Statistics	<b>RIGHT DOWN</b> Redo move
<b>3</b> Who plays	<b>8</b> Help	<b>FIRE CLEAR</b> See comments
<b>4</b> Undo move	<b>9</b> Exchange players	
<b>5</b> See comments	<b>0</b> See comments	
* Undo move	# Redo move	

Comments

Some keys operate in relation to situation:

**FIRE** or **[5]** :

- *Game finished*: start a new game
- *Demo*: turn player who has a move into human
- *Game in process*: complete current move (same as double-tap)

**CLEAR** or **[0]**

- *Game finished*: start a new game
- *Demo*: turn player who has a move into human
- *Game in process*: reduce move (remove last dot from the move)

## Game Keys

Game keys provide a shortcut to commands:

<b>[A]</b>	Preferences
<b>[B]</b>	Who plays
<b>[C]</b>	Exchange players
<b>[D]</b>	Statistics

## Commands

To execute a command press a screen button (Left or Right or Middle depending on the model) and select a command from the list. With some touchscreen devices commands are available from Main (Top) menu. As mentioned previously, you can also activate commands with phone keys (in Command or Non-pointer modes) or with game keys.

The commands are explained below:

<b>Undo move</b>	Take back last move. In a human vs computer game the corresponding computer move is also taken back. With an unregistered version you can't undo opening (starting) moves. The command is also available after game terminates. In a demo game (computer vs computer) "undo move" suspends the game. The game continues after all taken back moves are redone.
<b>Redo move</b>	Redo previously taken back move (-s).
<b>Swap players</b>	Exchange players. In human vs computer game this causes a computer to move.
<b>Advise move</b>	If you play against the computer, you can ask your opponent's advise (and it is sincere !). The advice depends on your opponent's skill and some random values. You can also ask an advice in human-vs-human game in which case average computer skill is assumed.
<b>New game</b>	Starts a new game. In case a game is in progress, a confirmation is required. After game terminates you have to wait for about 2.5. seconds before you can start a new game.
<b>Preferences</b>	Bring up Preferences form. You will need to start game if game rules are modified.
<b>Who Plays</b>	Bring up Who Plays form. With a non-registered copy this command operates only between games.
<b>Statistics</b>	Bring up Statistics form
<b>Help</b>	Show online help. This is a very brief description of game rules, using keys, etc.
<b>Quit</b>	Terminate application

## Status Bar

Status bar appear on the right hand side of the game board and contains the following lines:

Line 1 (top)	Move number. Since move number increments with each move, it actually it counts half-moves (or plies). The colour is <b>green</b> if first plays has the move and <b>red</b> is second player starts the move
Line 2	When a game is in process, the line show number of taken back moves, empty if no moves. After game terminates a faces appears:

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	 – human won,  – human lost,  – for a human–vs–human or computer–vs–computer game
Line 3	Two letters representing player and skills ( <b>green</b> for first, <b>red</b> for second): <b>H</b> – human <b>D</b> – computer dumb <b>A</b> – computer average <b>S</b> – computer smart A letter for the player who has move is shown in a bright colour.
Line 4 (bottom)	Number of available dots.

# Other Screens

## Preferences

The following customised features can be set up in Preferences form.

To activate new settings enter **Accept** command. To discard operation and return to board view screen enter **Cancel** command.

Note that modification of game rules requires restarting a game. This doesn't apply to other settings.

## Game rules

Rule	Default	Description
Diagonal lines	ON	ON – the diagonal neighbours are considered as adjacent dots and can be crossed in same move. OFF – diagonal neighbours can't be crossed in same move
Crossed lines	ON	If <i>Diagonal lines</i> are disabled, this option is ignored, otherwise it specifies whether a new diagonal line segment can be drawn over an existing diagonal segment connecting the opposite dots to form an X shape. ON – diagonal segments can cross (X shapes are allowed) OFF – diagonal segments cannot cross (X shapes are not allowed)
Last wins	OFF	OFF – a player who remains with the last non-crossed dot loses ON – a player who crosses the last dot wins; this rule looks to be less challenging than the standard one

## Other settings

Setting	Default	Description
Auto-select	OFF	ON – A new dot is added to an existing move when a pointer moves to an empty dot, a move is reduced when the pointer returns to a previous dot, press FIRE to complete the move. OFF – FIRE needs to be pressed for adding a dot to current move, or truncating a move. Press FIRE second time for the last dot in selected move to complete the move. See <u>Operating Game</u> for more
Auto-swap	OFF	ON – automatically exchange players after game finishes OFF – don't exchange players, unless requested
Direction mode (non-touchscreen devices only)	ON for T9 OFF for other keypad	ON – use phone keys to operate pointer (see <u>Direction mode</u> ) OFF – use phone keys for entering commands (see <u>Command mode</u> ) Straight after the installation the application will try to guess whether or not your device has a T9 keypad and select the mode accordingly, but you can always change it later. The mode does not appear for a touchscreen device which uses

		<u>Non-pointer</u> mode if pointer is hidden, or <u>Direction mode</u> if pointer is visible
Show pointer (touchscreen devices only)	OFF	ON – show the pointer. Arrow and phone keys are used to operate the pointer OFF – hide the pointer. Arrow and phone keys are used for entering commands See <u>Direction mode</u> and <u>Non-pointer</u> mode for more information. The pointer is always visible for a non-touchscreen device.
Dragged select (touchscreen devices only)	OFF	If your device supports dragging and does it properly (some devices don't) you might wish to use dragging for move selection where you can just drag from one dot to another. You still need to use 'double-tap technique' for a single-dot move.

## Who Plays

This form allows to specify type and skill of each player, top line corresponds to the player who starts the game.

To modify a player, highlight corresponding line and keep pressing FIRE until you get what you are after.

To exchange players highlight last line (named '*Swap players*') and press FIRE.

To accept new players enter **Accept** command, or enter Cancel to discard new player settings.

## Statistics

The application keeps statistics of previous games. The statistics is shown in Statistics form.

The statistics can be view in Compact or Detailed view modes. To change mode enter **Detailed view** or **Compact view** command.

With a registered copy you can clear statistics with **Clear stats** command (after confirmation).

Enter **Close** command to close statistics screen and return to board view.

The statistics data are explained below.

### Compact view (default)

Human	Number of games won by human against the computer
Computer	Number of games won by computer against human
Terminated	Number of human-vs-computer games terminated with <i>New game</i> or <i>Quit</i> command. <i>Note that a game terminated after 4 or more moves is considered as lost for the human player</i>
Hum-hum	Number of human-vs-human games

**Detailed view**

Human 1ST	Number of games won by human as starting player against the computer
Human 2ND	Number of games won by human as second player against the computer
Comp. 1ST	Number of games won by the computer as starting player against human
Comp. 2ND	Number of games won by the computer as second player against human
Terminated	Number of terminated human-vs-computer games. See comments for <u>Compact view</u>
Hum vs Hum	Number of human-vs-human games
Hm won Dumb	Number of games where human defeated Dumb computer player
Hm won Avg	Number of games where human defeated Average computer player
Hm won Smrt	Number of games where human defeated Smart computer player
Dumb won Hm	Number of games where Dumb computer player defeated human
Avg won Hm	Number of games where Average computer player defeated human
Smrt won Hm	Number of games where Smart computer player defeated human

# Registration

If you like the game, you shouldn't regret about just few bucks spent on it – after all this is what we do for life.

By purchasing a product you contribute to development and support of first class software for alternative (non-monstrous) operating systems like SymbianOS, PalmOS, J2ME.

To register the product try the site you downloaded it from, if not try the following

<http://www.handango.com>  
<http://softwaremarket.nokia.com> (Nokia devices only)  
<http://www.smartsam.de>

After the purchase you will be given the registration code that needs to be entered along with the user name.

The user name appear as "Licensed to" at the bottom of Introduction screen.

Limitations of unlicensed copy:

- Registration Form at start
- UNREGISTERED at Introduction and Board View screens
- *Clear statistics* is not supported
- *Who plays* form can be used only between games
- Opening moves can't be undone
- Computer skills can be randomly changed, so that you practically cannot control computer skill. To me it appears as the most important restriction

# Appendix. Game Strategy

Though having a degree in Math, I am not really a professional mathematician. What I am going to suggest here is far from being exhaustive, but with a comprehensive strategy the game wouldn't be as challenging as it is! I hope my ideas will help you to beat Smart ... occasionally. If you feel like capable of developing your own theory you should better stop reading ...

While discussing the strategy I assume "last loses" rule, because "last wins" case is so simple that I can leave it to you as an exercise :)

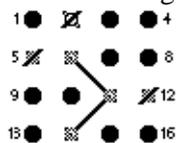
We start with ...

## Definitions

### Contiguous sets

The whole set of available (non-crossed) dots can be divided into *contiguous subsets*. Each pair of dots belonging to same contiguous set can be connected to each other either directly or through other non-crossed 'conducting' dots, while any pair of dots from different contiguous sets cannot be connected this way. This is very similar to *flood* or *bucket filling* (if you used a graphic editor, you know what it is about), but in our case the neighbourhood is defined according to game rules.

Consider the following position:



As you can see, the rules allow diagonal lines.

If the rules *don't allow* line crossing (X-shapes), there are four different contiguous sets:

- Set 1 (1 element): dot 1
- Set 2 (4 elements): dots 3, 4, 7, 8
- Set 3 (3 elements): dots 9, 10, 13
- Set 4 (2 elements): dots 15, 16

In case the rules *allow* line crossing, dot 10 can be connected to dots 7 and 15, therefore only set 1 remains isolated, while sets 2, 3, and 4 become a single set of 9 elements.

### Singles, doubles, triples and 'huge' sets.

I use term *single*, *double*, *triple* and *huge* for a set containing one, two, three, or more than three elements resp. If in the above example the rules don't allow line crossing there are 1 single, 1 double, 1 triple and one huge, while if line crossing is allowed we have one single and one huge.

## Move categories and non-splittable sets

As far as contiguous sets are concerned, each move can be one of the following:

*Deletion:* removes a set (doesn't apply to a huge set)

*Reduction:* makes a set smaller (not applicable to a single)

*Split:* divides a set into two smaller sets (applies to a triple or a huge)

Note that that some triples can't be split like Set 3 in the position above.

A set of 4 elements is non-splittable if the dots are arranged in a square and the rules allow diagonal lines and line crossing.

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We are getting to the real stuff now

## Positions With Singles Only

This case is so simple that I need to apologise for being silly :)

*Statement 1.*

*In a position containing only singles the beginner (i.e. player who has the move) loses if number of sets is odd and wins if the number of sets is even.*

Each player has no alternative to deleting a single, therefore a player starting with an odd number of singles get the last one, whereas if the number of singles is even, the last dot is left to the opponent.

## Positions Containing No Huge Sets

In this section we consider positions containing only singles, doubles and triples.

Let  $S$ ,  $D$  and  $T$  be the number of singles, doubles and triples. Since single-only case has been discussed previously, we assume that the position has at least a double or a triple, in other words  $T+D > 0$

*Statement 2.*

*In a position containing singles, doubles and triples so that  $T+D > 0$  the beginner loses if and only if  $S$ ,  $D$  and  $T$  are either all even, or all odd.*

For simplicity we'll use  $E$  for Even,  $O$  for Odd,  $1$  for One,  $N$  for None with  $T+D+S$  layout. For example  $1+N+O$  means one triple, no doubles and odd number of singles. We also assume that player  $A$  has the move, and player  $B$  is  $A$ 's opponent.

Statement 2 is equivalent to the following set of statements

**Statement 2a.** In situation  $E+E+E$  ( $T+D > 0$ )  $A$  loses

**Statement 2b.** In situations  $O+E+E$ ,  $E+O+E$  and  $E+E+O$  ( $T+D > 0$ )  $A$  wins

**Statement 2c.** In situations  $E+O+O$ ,  $O+E+O$  and  $O+O+E$  A wins

**Statement 2d.** In situation  $O+O+O$  A loses

Let's prove the statements one after another.

### Proof of statement 2a ( $E+E+E$ )

B uses the following strategy:

- If A deletes a single, B deletes another single
- If A deletes or reduces a double or a triple, so that *more than one non-single remains* ( $T+D>1$ ), B repeats A's move with another set of same size.
- If A splits a triple into two singles, B removes another triple (alternatively, B can repeat A's move if there are splittable triples)
- If A deletes a non-single or reduces a non-single to a single, so that *only one non-single remains* ( $T+D=1$ ), B takes an opposite move for the remaining non-single: it is reduced to a single if A's move was a deletion, or deleted if A's move was a reduction.

It can be seen that while non-singles are around, B always keeps A with an even number of singles, doubles and triples, but before removing the last non-single B leaves A with an odd number of singles so that A loses.

### Proof of statement 2b ( $O+E+E$ , $E+O+E$ , $E+E+O$ )

First consider situation  $T+D=1$ , i.e.  $1+N+E$  or  $N+1+E$ . In this case A reduces the only remaining non-single into a single leaving B with odd number of singles, so that B loses.

Case  $T+D>1$  is not less obvious. A just deletes the whole set of a category with the odd count. In other words: in case  $O+E+E$  A deletes a triple, in case  $E+O+E$  A deletes a double, in case  $E+E+O$  A deletes a single. This leaves B with situation  $E+E+E$  where  $T+D>0$ , so that B loses according to statement 2a.

### Proof of statement 2c ( $E+O+O$ , $O+E+O$ , $O+O+E$ )

We again start with  $T+D=1$ , i.e.  $N+1+O$  and  $1+N+O$ . In this case A removes the last non-single leaving B with odd number of singles.

In case  $T+D>1$  A leaves B with  $E+E+E$  situation using the following rules:

- case  $E+O+O$  ( $T+D>1$ ): reduce a double to a single
- case  $O+E+O$  ( $T+D>1$ ): reduce a triple to a single
- case  $O+O+E$ : reduce a triple to a double

### Proof of statement 2d ( $O+O+O$ )

D and T are both odd, therefore  $T+D > 1$  is always the case

Consider all possible moves of A:

Proof of statement 2a ( $E+E+E$ )

- A deletes a single, double or a triple. This reduces the count for singles/doubles/triples by one leaving other counts unchanged. Therefore B gets a position with one even and two odd counts, and wins it according to statement 2c
- A reduces a triple or a double to a single. This decrements T or D and increments S. As a result B gets E+O+E, or O+E+E and wins according to statement 2b
- A reduces a triple to a double. B gets E+E+O and wins (statement 2b)
- A splits triple into two singles. This decrements T, but doesn't change the parity of D and S, therefore B gets E+O+O and wins (statement 2c).

In other words, after any A's move:

- If only one non-single remains, B either deletes it, or reduces it to a single, leaving A with odd number of singles and no other sets
- If two or more non-singles remain, B can always turn the position into E+E+E and then use the strategy described in the proof of statement 2a

## Positions With Huge Sets

With 'huge' sets the situation is not as straightforward, so that looking ahead is by far the best I can suggest. Since for CPU and memory limitations I wanted to keep the code non-recursive, there is only 1 step look ahead performed by a Smart player and occasionally by an Average player.

### Positions containing one set of 4 elements and no other huge sets (wrong!)

In case you are looking for another exercise for your brain ...

The following paragraph could be a good 1st April joke. Since it is not 1st of April, I sincerely confess that it is wrong. Can you find the breach in the following reasonings ?

.....

Consider a position containing one set of 4 dots, and maybe some doubles, singles and triples.

We are going to prove the following statement:

**Statement 3. In case a position has one set of four elements and no other huge sets:**

- **if there are no other sets the beginner wins**
- **if there are other (non-huge) sets, the position is winning for the beginner if and only if it is winning without the huge set.**

We will refer to the position as 1+T+D+S.

If set of four is the only remaining set (1+N+N+N), A just turns it into a single, so that the opponent loses instantly.

We therefore concentrate on positions containing non-huge sets, in other words  $T+D+S > 0$ . What statement 3 actually declares is that we can disregard a set of four, and make the judgement by analysing  $T+D+S$  combination according to statements 1 and 2, which is equivalent to the following.

**Statement 3a. If the position has no doubles and triples ( $1+N+N+S$ ), beginner loses if  $S$  is an odd number and wins if  $S$  is an even number**

**Statement 3b. If the position has a double or a triple ( $T+D > 0$ ), beginner loses if  $D, T$  and  $S$  have same parity, and wins otherwise.**

**Proof of statement 3a.**

If number of singles is even, A reduces the huge to a single, leaving B with odd number of singles, so that B loses.

If number of singles is odd, B uses the following strategy:

- If A deletes a non-last single, B deletes another single
- If A deletes the last single, B reduces the huge to a single
- If A reduces the huge, B removes all other dots from the huge.

As a result of that A always get a position with odd number of singles. Eventually A is forced to either reduce the huge, or delete the last single, while either of moves leaves A with odd number of singles.

**Proof of statement 3b**

Consider the following outcomes:

**1+O+E+E, 1+E+O+E or 1+E+E+O** A reduces the huge to a triple, double or single depending on which counter is odd. This leaves B with E+E+E layout so that B loses according to statement 2a

**1+E+O+O, 1+O+E+O or 1+O+O+E** A reduces the huge to a triple, double or single depending on which counter is even. This leaves B with O+O+O layout so that B loses according to statement 2c

**1+E+E+E or 1+O+O+O**

B uses the following strategy:

- If A reduces the huge, B removes all other dots from the huge leaving A with E+E+E or O+O+D
- If A declines to reduce the huge, B uses the strategy defined in the proof of statements 2a–2d. As a result of that 1+O+O+O is turned into 1+E+E+E if needed, 1+E+E+E is maintained until it turns into 1+N+N+O, which is a lost for A according to statement 3a.