XScorch
User Manual

Project XScorch
Team Core Dump
January 29, 2003

Change Record:

Date	Version	Changes/Additions	Responsible Person
1/29/03	1.0	Created document	Alon Gotesman
1/31/03	1.1	Fixed formatting of document	Alon Gotesman
2/4/03	2.0	Fixed up all the issues stated in correction form, did more formatting, and wrote battle section	Jeremy Stolarz
3/12/03	3.0	Removed mention of Team functionality. Updated user interface illustration	Alon Gotesman

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1) Credits

A majority of the following manual pages were composed by Justin David Smith, <justins(at)chaos2.org> and are copyright(c) 2001,2000 A few isolated paragraphs were cited from the Scorched Earth 1.5 tutorial, written by Wendell Hicken and copyright (c) 1991-1995. Team Core Dump enhanced and formatted this final version.

2) Overview

Xscorch is a clone of the classic DOS game, "Scorched Earth". Xscorch is an exciting artillery combat game, where the goal is to destroy enemy tanks using powerful guns and avoid getting killed using shields and other accessories. Using money won at the end of each round, players purchase upgraded equipment, than target enemy tanks by adjusting the angle and firing power of their turrets. The goal is to destroy enemy tanks before they destroy you.

3) Platform

System Requirements:
        Linux Machine
        GTK+1.2 or better
Optional/Recommended:
        Libraries MikMod (for sound) and GNOME

4) Definitions

AI: Artificial Intelligence. Computer players are capable of varying degrees of "intelligence." The lowest AI level is Moron, the highest is Insanity and in-between there exist five separate and distinct difficulty levels.

Auto-Defense: An accessory item that can be purchased that allows the activation of defensive accessories at the beginning of a round rather than during a player's turn. This allows a player to have shields, parachutes, and other accessories set up before shooting starts, and therefore before possibly getting damaged or destroyed.

5) Getting Started

To obtain Xscorch visit the official website, located at http://www.robotarmy.com/jeremy/cs115/ and download the latest version of the source code. A window will appear, at which time you should select the "Save" option and place the file in the desired directory. The code is in tarball form (*.tar.gz) so it must first decompress it. Once this is completed and you have the ability to open all the files type './configure' to create the make file needed to compile the software. If you would like networking capabilities you must compile the code using the command './configure --enable-network' instead. Next, 'make' to compile the file, and finally type 'make install'

to install the file. The game is now installed on your system! Type 'xscorch' to start the game. Please refer to section "Command Line Options" for more command line options.

FILES
  ~/.xscorch/config
        User's default configuration for xscorch.

  xscorch.txt
        Copy of this manual page. This file is installed to your local share directory, and is used by the on-line help system.

  copying.txt
        Copy of the GPL. This file is installed to your local share directory, and is used by the on-line help system.

  tankprofiles
        Profile bitmaps for the tanks, usually stored in the local share directory.

6) User's Manual

6.1 - GAMEPLAY

We at Xscorch encourage the beginning user to experiment with the many options in the main menu. Most of the options are straightforward, and you can begin playing with only a little bit of information. A number of options (all which are explained later) affect the difficulty of the game – note that the default options make for a reasonable level of game play.

Most of the game configuration is controlled using menus, although a few are command-line options, which are explained below. Once you are ready to begin a new game, you may want to select "Save Options" to save your configuration, then select Begin Game and start a new game.

Game play is divided up into a predetermined, player-selected number of rounds. Each round consists of two phases: the Inventory Phase and the Battle Phase. In the Inventory Phase, you can buy weapons to shoot at your opponents, and accessories to help defend your tank. See the Inventory section below for information on the weapons and accessories you may buy. In the Battle Phase, you setup defenses, select weapons, aim and fire at your opponents. For more information refer to the section on Battle below.

6.2 - INVENTORY

Players have the option of buying different weapons and accessories, making for more interesting games. Weapons are just that: an assortment of missiles, including ICBM-like warheads, napalm, lasers and a number of custom weapons to bring down specific defenses. Accessories increase a tank's chance of survival, including guidance systems, shields, fuel, batteries, parachutes, transporters, and other odds-and-ends.

At the beginning of a round, each player is given an opportunity to buy or sell weapons and accessories. Each player is capable of carrying up to 99 of any item at one time, with the exception of a few weapons that have an infinite supply (for example, Baby Missiles). These weapons cannot be purchased.

Weapons and accessories are sold in bundles; the price of a bundle is displayed in the inventory, and players must buy items as complete bundles. The exception to this is when a player attempts to buy more of an item than their inventory can hold; in this case, the bundles are detached and the weapons are sold on an individual basis, with a small markup applied.

Players may also sell weapons and accessories in their inventory. Again, items are generally sold as bundles. The player will receive a less-than-retail-value, salvage amount of money for the sale.
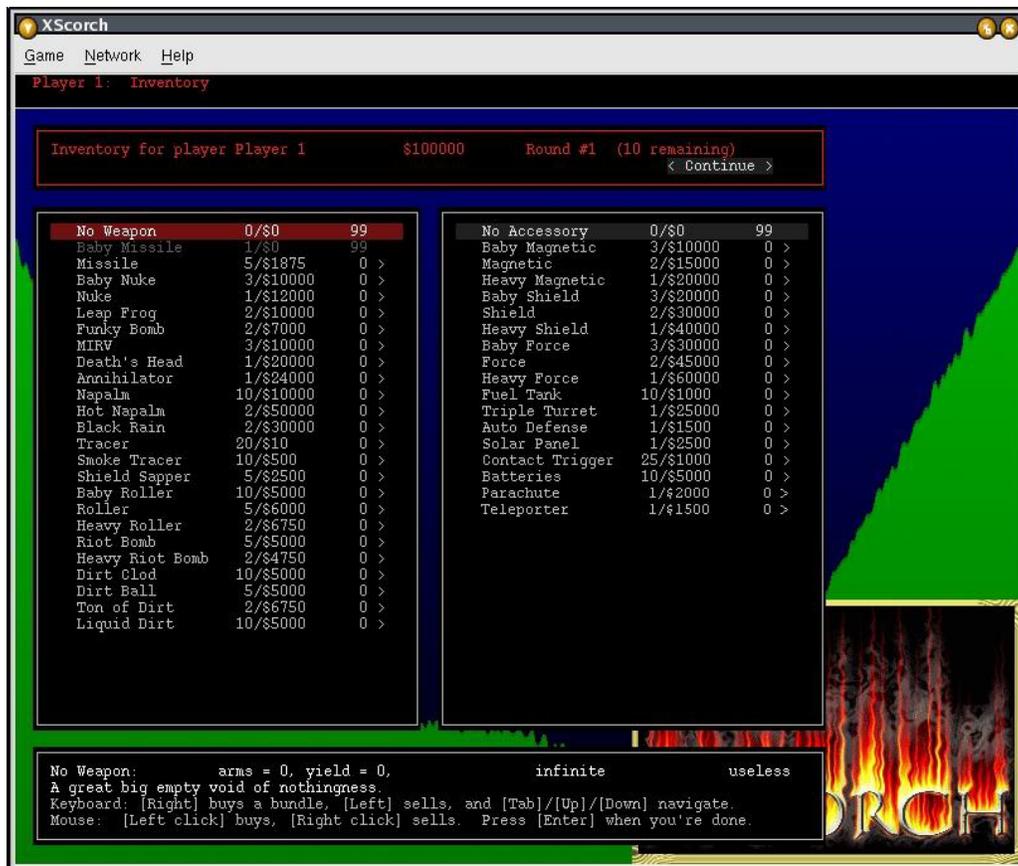
In the Inventory screen, two panels are displayed, listing the weapons and accessories available. There are several controls you can use at this point in the game:

TAB: Switches between the various panes
UP Arrow: Allow the player to scroll up through the list of items
DOWN Arrow: Allow the player to scroll down through the list of items
RIGHT Arrow   Buy the highlighted bundle

Left Arrow   Sell the highlighted bundle

For each item, the name, bundle size/total price, and current inventory are displayed.
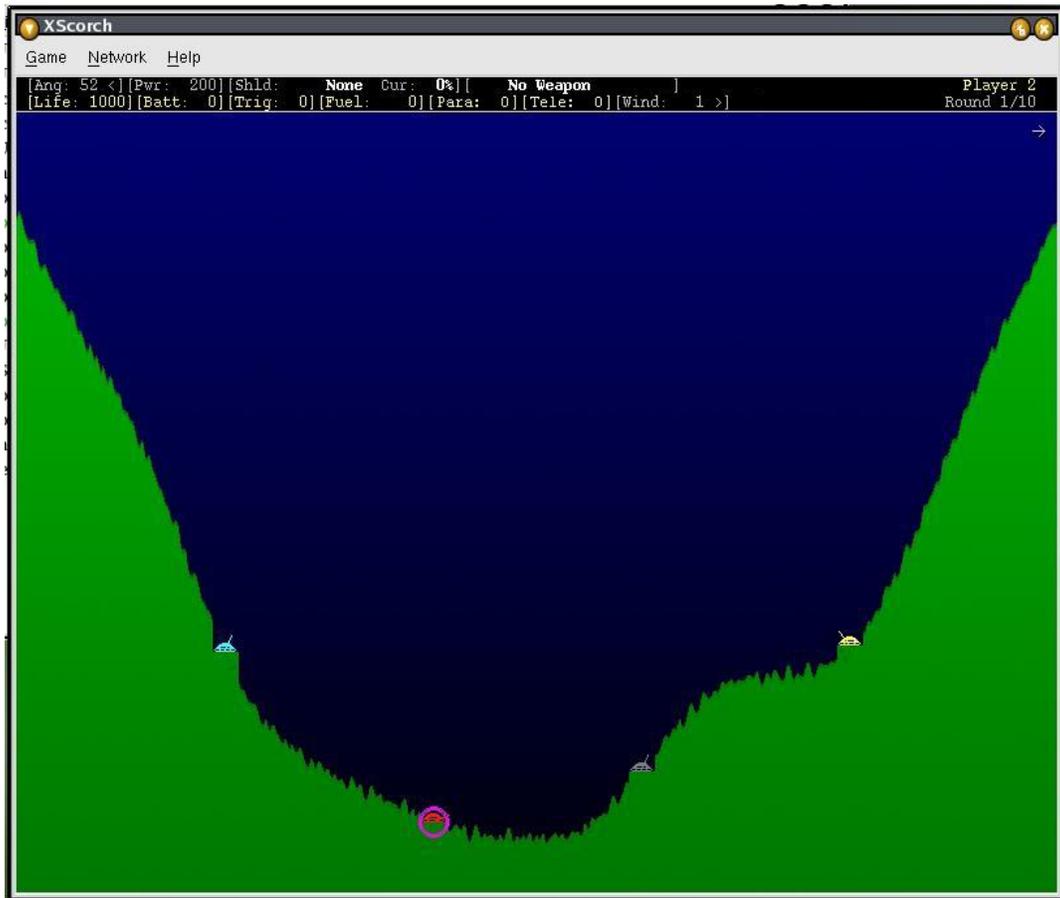
        Items that can neither be bought nor sold will still appear. However, if the player has maxed their inventory for that item, or they cannot afford to purchase the item, or item has a higher arms level than the player is allowed, then the item is grayed out and cannot be purchased. Items that can be bought will appear with an arrow pointing to the right, and items that can be sold will appear with an arrow pointing to the left.

        Xscorch item description are listed in the following two sections:

6.2.1 – Weapons List

Baby Missile	A small triple turret capable missile that tanks have in near infinite
Missile	A fairly large and inexpensive triple turret capable conventional missile
Baby Nuke	A missile with a miniature tactical nuclear warhead.
Nuke	A missile with a tactical nuclear warhead
Leap Frog	When this missile detonates the first two times, it shoots out a new one.
Funky Bomb	The funky bomb is a very unpredictable cluster bomb.
MIRV	Multiple Independently targetable Re-entry Vehicles. Branches multiple missile warheads at apex of trajectory
Deaths Head	A very large MIRV with nine nuclear warheads!
Annihilator	A missile with a huge tactical nuclear warhead.
Napalm	A small globe filled with jellied gasoline.
Hot Napalm	A large globe filled with jet fuel.
Black Rain	Looking up, you see a flock of birds. No wait! Those aren't birds... Branches multiple napalm warheads at apex of trajectory
Tracer	A missile with no warhead. Pretty useless.
Smoke Tracer	A missile with no warhead that leaves a trail of smoke.
Shield Sapper	A missile with a warhead designed to drain shields it hits directly.
Baby Roller	A weapon that rolls downhill and then detonates a small warhead.
Roller	A weapon that rolls downhill and then detonates a warhead.
Heavy Roller	A weapon that rolls downhill and then detonates a large warhead.
Riot Charge	Riot Charge!!!!
Riot Bomb	A bomb that clears dirt instead of damaging players.
Heavy Riot Bomb	A bomb that clears lots of dirt instead of damaging players.
Dirt Clod	Drop a small chunk of dirt on someone.
Dirt Ball	Drop a chunk of dirt on someone.
Ton Of Dirt	Drop a large chunk of dirt on someone.

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Liquid Dirt              Drop a bunch of mud on someone.
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6.2.2 – Accessories List

Baby Magnetic	A small low-power magnetic shield.
Heavy Magnetic	A large high-power magnetic shield.
Baby Shield	A small physical shield layer.
Shield	A physical shield layer around the tank.
Heavy Shield	A large physical shield layer.
Baby Force	A small but impregnable force field.
Force	A force field surrounding the tank.
Heavy Force	A large heavy-duty force field.
Fuel Tank	Some fuel for a tank's motor will allow it to move around.
Triple Turret	A triple turret can shoot three of some missiles at once.
Auto Defense	Allows you to bring up shields at the beginning of a round instead of during your turn
Solar Panel	Solar Panels recharge shields slightly each turn.
Contact Trigger	With contact triggers, missiles will explode as soon as they hit anything.
Batteries	A tank's self-repair system needs batteries to run. Restores 5% of tanks original health
Parachute	Prevents tank from taking damage when it falls
Teleporter	Teleports tank to a new random location

6.2.3 – Tank list

Standard	Mobile, medium armor, medium fuel efficiency, medium base size
Double Track	Mobile, light armor, high fuel efficiency, smaller base size
Fortification	Stationary, heavy armor, larger base size

6.3 – BATTLE

In its simplest form, the battle stage is when the players take turns inputting their tank commands (see *6.3.1 – Tank Controls*) in attempts to destroy one another. A player's turn lasts until he or she fires a weapon. Each round, a random turn order is established and it repeats until the end of the round (when only one tank is left or when no tanks are left). Exactly what occurs after a turn depends on whether sequential or simultaneous game play has been selected (see *6.7.7 – Gameplay Options*):

Sequential: In sequential mode, each player's turn is resolved individually. In other words, all inputted commands will take place when inputted and the shot fired will be immediately resolved. Any changes the weapon causes to the landscape and/or damage made to tanks is recorded, and if a player's tank is destroyed, that player gets no more turns until the next round.

Simultaneous: In simultaneous mode, each player takes his or her turn individually, but the turns are all resolved at once. In other words, a player will input commands to the tank, but will not immediately see the results. When everyone has inputted their

commands, then all commands are resolved simultaneously. Thus, all the tanks will fire their weapons at the same time.

The main game screen shows tank locations and has a status bar on the top that shows turret angle; shot power; what shield is selected and current power of the shield; what weapon is selected; current life; the amount of batteries; contact triggers; fuel; parachutes; and teleporters in the inventory; wind direction and strength; the current round; and whose turn it is. This information is also colored to match the player's tank color.

6.3.1 – Tank Controls

Left, Right

> Change the turret angle. This will adjust the turret angle in increments of 5 degrees. For finer control, hold Shift to adjust the angle in increments of 1 degree.

Up, Down

> Change the firing power, in the range of 0 to 1000. This will adjust the firing power in increments of 20. For finer control, hold Shift to adjust the firing power in increments of 1.

Tab

> Select the next weapon available in your inventory.

Shift+Tab

> Select the previous weapon available in your inventory.

B, b

> Activate a battery. A single battery can restore 5% of damage done to your tank, and therefore restore the maximum firing power by 5% when you are damaged. You must have a battery to discharge in your inventory to exercise this option.

E, e

> Activate or energize the currently selected shields.

F, f

> Activate your fuel tanks. A window will be displayed, indicating the amount of fuel you have available. As long as you have fuel, you may use the Left and Right arrows to move one unit to the left or right, respectively. In general, you cannot move your tank up a steep hill. Immobile tanks will not be able to exercise this option.

R, r

> Force a redraw of the screen.

S, s

> Toggle the currently selected shields. The currently selected shields are the shields that will be used when you energize. Shields are classified by a power number with a type suffix: M for magnetic shielding, F for force shielding, and S for your standard, run-of-the-mill shields. If no shields are available, 0 is displayed.

C, c

> Toggle contact triggers on/off. This is only meaningful if you actually have some contact triggers of course, and when tunneling is enabled. Weapons that are fired after this point will have contact triggers equipped (until you run out).

T, t

> Activates a teleporter, assuming at least one exists in a player's inventory. The tank should disappear from the screen and reappear in a random location.

0 – 9

> Display information about a particular player. 1 gives information about Player 1, and 0 gives information about Player 10.

Enter

> Accept your orders.

Ctrl+Y

Bring up the System Menu (this can also be accessed from the menus). You can control certain graphics options from the system menu, clear the screen of smoke trails, and end a round prematurely.

Ctrl+Z

Pauses the game.

Ctrl+R

Resign from the game. This will end the game for everyone. You will be asked to confirm the resignation.

6.5 - SYSTEM MENU

The system menu gives you some control over the game while it is in progress. In this menu, you will have options to change how the game is displayed (e.g. the Graphics Fast option described below). You also have access to a few useful commands, described below. You can bring this up by pressing *Ctrl+Y* during the game or by using the menus.

Mass Kill

Kills everyone still alive in the round. No player gets credit for the kills, and none are considered a suicide. This option is useful if all human players have already been eliminated from the game, but the AI players are making no progress whatsoever in annihilating each other. This option ends the current round only.

Erase Smoke

If you have used smoke tracers or have Trace Paths enabled, then this option will clear all smoke trails from the sky.

Retreat

This feature is not yet implemented.

Resign Game

> Resigns from the current round and all remaining rounds. This option ends the entire game, and will take you back to the intro screen.

Sound Setup

> Takes you to the Sound Options window. This will allow for both sounds/music while the user is in the menu option screen. It will also allow sound-effect during game play

6.6 - AI PLAYERS

Human

> The humans believe they are the superior mind. The AI's rather disagree with that sentiment. Keep this in mind when you are wondering why 9 AI's would want to simultaneously target your tank...

Moron

> This AI fires at random. Of all the AI's, this one has by far the highest suicide rate. An alternate name is ``Cannon Fodder''.

Shooter

> This AI goes for targets it has a line-of-sight to. It's not a great player otherwise. This AI buys weapons that have the best economical yield, but during the game it will select weapons that have the highest yield.

Spreader

> This AI is similar to the Shooter, except a Spreader buys weapons with the highest yield, without regard for the price.

Chooser

> This AI chooses a victim. Once chosen, the victim is attacked until they are dead, or the Chooser loses the ability to reach the victim. This AI does not need line-of-sight, but fortunately it cannot compensate for wind.

Calculator

> This AI is like Chooser, except a Calculator can compensate for the wind. These guys are fairly deadly in a fight; they also tend to allocate large budgets to defense and offense.

Annihilator

> This AI goes for weapons that will cause as much damage as possible, without much regard for individual victims. This AI prefers spread weapons to the more focused, precision weapons. A few Annihilators can clear the terrain easily. These AI's don't worry about defenses too much. With their destructive tendency, they won't survive long anyway - but neither will anyone else.

Insanity

This AI is very much like the Annihilator.

Economist

This AI focuses on a defensive strategy, buying the strongest available shields, solar panels to replenish shields and sets auto-defense so the shields can be raised immediately. Offensively, the opponent buys missiles and napalm to weaken shields, than selects a single opponent (preferably one with shields) and attacks it until it is eliminated. While the opponent still has shields, it will aim close to the target rather than on target. Once shields are eliminated it will then shoot on target.

Unknown

This selects one of the above AI's at random, but you will not be informed which AI was selected.

6.7 - CONFIGURATION OPTIONS
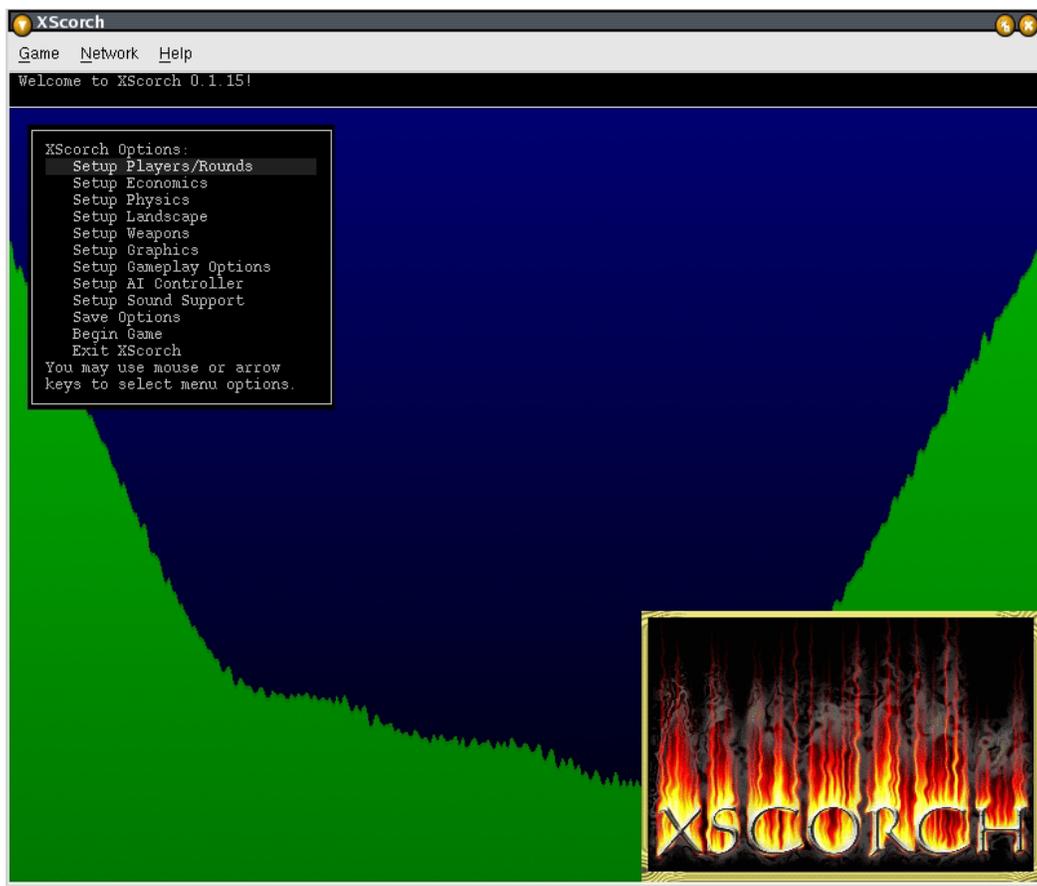
The following options can be set by selecting them from the main menu with either the keyboard or the mouse. Once all options have been set, select "Begin Game" to start playing.

6.7.1 - Players/Rounds

Number of Players (integer, 2-10)
    Set the number of players participating in the game.

Number of Rounds (integer, >= 1)
    Set the number of rounds to play for this game.

AI Type (list)
    Select the AI type. Human players are ``Human''; the remaining AI's are
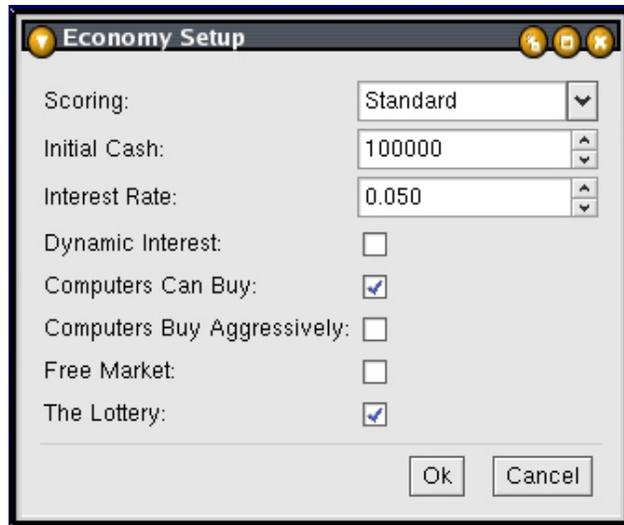   documented above.

Player Name (string)
    Give a unique name for each player.

Tank Style (list)
    Select the type/shape of the tank, for each player.

6.7.2 – Economics

Scoring (list)

Specifies in what manner each player scores points (money) at the end of each round:

BASIC scoring:	Players receive points only for killing tanks and surviving a round.
STANDARD scoring:	Players get less points for actually killing a tank, but get points every time they damage a tank or shield.
GREEDY scoring:	Works like STANDARD scoring, but the final rankings at the end of each round are based on the Net Worth of your tank, e.g. how much cash you have in the bank plus the depreciated value of all weapons, etc. in stock ("He who dies with the most toys wins").

Initial Cash (integer, 0-1000000)

Amount of money each player should start with.

Interest Rate (float, 0-0.30)

The interest rate for savings, compounded once per round.

Dynamic Interest (toggle)

If enabled, interest rates will change during the game.

Computers Can Buy (toggle)

If enabled, computers are permitted to buy items. The AI's are very uninteresting if this option is turned off.

Computers Buy Aggressively (toggle)

If the previous option is enabled, the AI's will buy items conservatively. With this option, the AI's will allocate larger budgets and buy bigger items early in the game.

Free Market (toggle)

In Free market play Equipment and weapons are affected. When the game initially begins the prices are set. After the initial round prices begin to adjust depending on what the demand is for the item. For example of a person constantly buys Napalms the price every round will go up. There are set grounds for the prices (the price of an item will not go less then this set price).

The Lottery (toggle)
    If the lottery is enabled, there will be a random drawing at the start of each round. A random player will receive a bundle of a random weapon for free as the lottery award. This is a great way to inject a little extra life into AIs who are usually conservative buyers. Plus it's always great fun when you get a free Annihilator...

6.7.3 – Physics
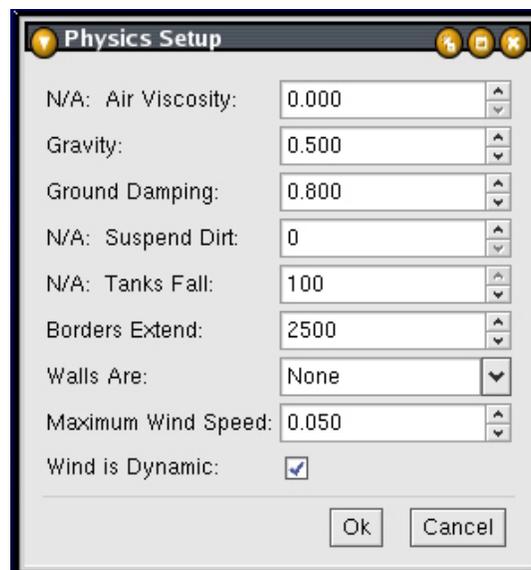
Air Viscosity (float)
    This feature is not yet supported

Gravity (float, 0-10)
    Specify the gravity, in pixels per cycle squared (one cycle is roughly 50 milliseconds).

Ground Damping (float, 0-10)
    Specify the ground damping, used in tunneling calculations.

Maximum Wind Speed (float, 0-10)
    Specify the maximum wind speed, in pixels per cycle squared. The actual wind velocity is initialized once per round, to some value in (-max, max).

Suspend Dirt (percentage)
    This feature is not yet supported

Tanks Fall (percentage)

    This feature is not yet supported

Borders Extend (integer, >= 0)

    This specifies how far off-screen weapons should be tracked, when you are playing with no walls. When this value is zero, weapons will disappear as soon as they leave the screen in the horizontal direction, even if wind would have brought them back on-screen.

Walls Are (list)

    Specify how weapons behave when they hit a boundary. Note, boundaries are not always ``concrete'' -- this specifies how the sides and ceiling behave:

None	The sides and ceiling are open.
Concrete	All sides are solid. Weapons hitting any boundary will explode.
Padded	Weapons hitting the sides and ceiling will bounce off, although at a reduced velocity.
Rubber	Weapons hitting the boundary will bounce off at exactly the same velocity.
Springy	Weapons hitting the boundary will bounce off with an additional "kick" to the velocity.
Wraparound	The ceiling is open. Weapons going off one side will reappear on the opposite side. Explosions will also wrap around the screen if they detonate near an edge.
Random	One of the above types of walls is selected at random.

Wind is Dynamic (toggle)

    Normally the wind remains constant through a round. If this is enabled, the wind will change once per turn.

6.7.4 – Landscape
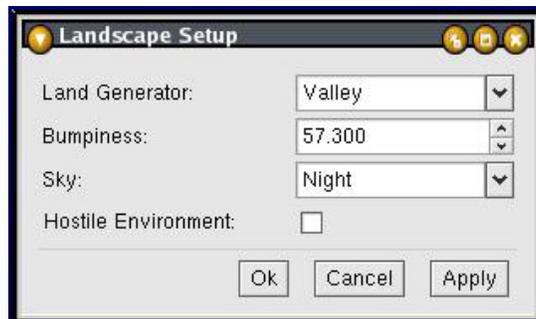
Land Generator (list)

    Specify the generator to use to create the land.

Bumpiness (percentage)

Specify the noise on the generated landscape.

Sky (list)
    Specify the background sky.

Hostile Environment (toggle)
    When selected, hostile environments in the form of meteors or lightning bolts.
    These hazards appear random times and hit random spots, producing the same
    amount of damage as baby missiles to both land and tanks. Shields act on
    environmental hazards just as they do on any other projectile.

6.7.5 – Weapons

Arms Level (integer, 0-4)
    Specify the maximum arms level for the game. Only weapons with this arms level
    or lower may be purchased by any player, under normal circumstances.

Bomb Icon Size (integer, 0-4)
    Specify the size of the bomb icons, while they are traversing their path in the sky.
    This does not affect the size of explosions, or the size of the smoke paths (if trace
    paths is on).

Scaling (float)
    Scale the size of explosions by this value. If playing on a very large or very small
    playing field, you might want to adjust this value.

Tunneling (toggle)
    If set, weapons are allowed to tunnel through land. If you enable this, you will
    want to buy contact triggers if you want a particular weapon to always detonate on
   impact (instead of tunneling through land).

Trace Paths (toggle)
    If enabled, all weapons leave a smoke trail to reveal their trajectory. If this option
    is off, you can still use Smoke Tracers to determine the path a weapon will take.

Useless Items (toggle)
> Some weapons are not useful given the current configuration (e.g. contact triggers are irrelevant if tunneling is disabled). If this option is enabled, then weapons that will have no effect are not listed in the inventory screens.

6.7.6 – Graphics
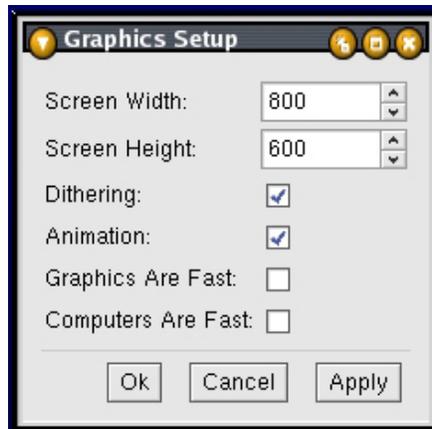
Screen Width (integer)
> Set the width of the playing field, in pixels.

Screen Height (integer)
> Set the height of the playing field, in pixels.

Dithering (toggle)
> If enabled, the land and sky gradients will be dithered. This option is particularly useful on 16-bit displays, where the gradient is very noticeable otherwise. This does slow down land generation somewhat.

Animation (toggle)
> If enabled, explosions and other effects will be animated. This option can also be controlled from the System Menu.
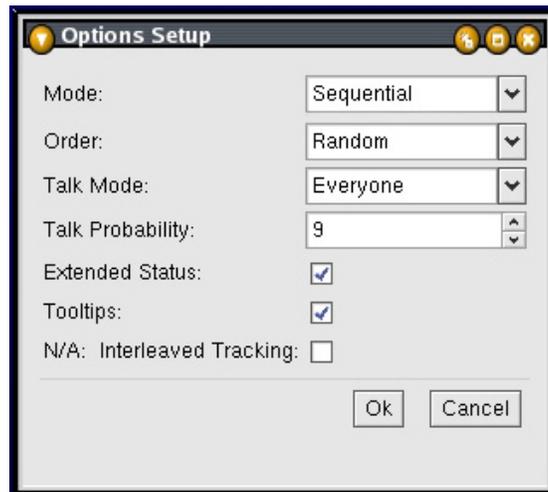
Graphics Are Fast (toggle)
> If enabled, all graphics are always as fast as possible. This option can also be controlled from the System Menu.

Computers Are Fast (toggle)
> If enabled, graphics are fast when there are only computer players alive. This option can also be controlled from the System Menu.

6.7.7 - Gameplay Options

Mode (list)
>   Determines if all players will fire at once (Synchronous), or whether each player
>   will fire independently (Sequential).

Order (list)
>   Determines the player order.

Talk Mode (list)
>   Determines who is allowed to talk.

Talk Probability (percentage)
>   Determines the likelihood that a player will speak at the end of a turn.

Extended Status (toggle)
>   If set, the status bar will contain an additional row of extended information during
>   the game (things such as trigger, battery, parachute, and teleporter inventories;
>   life; and wind).

Tooltips (toggle)
>   If set, tool tips will be displayed where available.

6.7.8 - AI Controller

Human Target Practice (toggle)
> AI's will always prefer human targets to AI targets (except for AI's that fire at random). When playing against 9 Calculators, this can make your day pretty lousy.

Allow Offset Targeting (toggle)
> Generally, when a weapon hits a shield it does less damage than an explosion detonating right outside the shield (weapons hitting the shield do not have a chance to detonate). This changes the AI targeting behavior so they will deliberately aim outside the shield, if their intended victim has raised shields.

Always Offset (toggle)
> If the above option is set, this option will force the AI to always offset its targeting as if the player had raised shields. This allows the AI to compensate for cases where the player may simply not have had their turn yet to raise shields. The downside is the AI will never attempt to score a direct hit with this option enabled.

Enable Scan Refinement (toggle)
> If set, harder AIs are allowed to refine their trajectories by computing trajectories that take into account player shielding effect and various other factors they do not normally consider. This option could slow down game play a bit but makes the AIs much more difficult.

No Budget Constraints (toggle)
> AI's will spend as much money as they can, disregarding their budget preferences.

6.7.9 - Sound Setup

Enable Sound (toggle)
When set, music and sound effects will be played.

Use HQ Mixer (toggle)
When set, mikmod's high-quality mixer will be used.

6. 8 - COMMAND-LINE OPTIONS

--help
Display a brief synopsis of the command-line options available.

--insanity
This is insanity, Max! Or what if it's genius?

--yields
Display weapon yields, and economical yields.

--geometry=wxh
Specify an initial window geometry for xscorch, where _w is the width and _h is the height of the playing field. This is useful for displays less than around 800x600 resolution. Note this option over- rides the settings in the config file, but you can save the new options to your config file so you don't have to specify this every time. You may also use -g.

--config=file
Load an alternate user config file, in file.

--sound
Enable music and sound effects. You may also use -S.

--nosound
Disable music and sound effects. You may also use -s.

--hqmixer
Enable use of the high-quality mixer, if sound is enabled. This may use a lot of CPU power on older machines.

--nohqmixer

Disable use of the high-quality mixer, if sound is enabled.

--name

Set the name of your player, if you are initiating a network game. By default, your user name is used.

--port

Set the port number to use in a network game. This option is only relevant if you also specify --client or --server. The default is dependent on the protocol number, but is some large port number.

--client=server

Start Xscorch in client mode, and connect to server (which should already be running). If --name and --port are not specified, reasonable defaults are used.

--server

Start xscorch in server mode, and wait for connections from the clients. --name may be used in conjunction to specify the name of this player.

7) Traceability Matrix

Requirement #	Manual Section(s)	Comments
1.1-1.5	6.6	
2.1, 2.6	6.7.2	
2.2-2.5	N/A	Programming issues, rather than feature issues.
3.1-3.2	6.7.2	
3.3-3.4	N/A	Must code new calculation and display methods
4.1-4.2	N/A	Technical issues.
5.1-5.5	6.7.4	
6.1-6.3	6.2.2	
6.4	N/A	GTK drawing issue
6.5	4	
7.1-7.2	6.2.2	
7.3, 7.5	6.3.1	
7.4	N/A	Coding issue
8.1-8.3	6.7.7	
8.4-8.8	N/A	New programming, design and scoring issues