

V2:

Voraldo major restructure

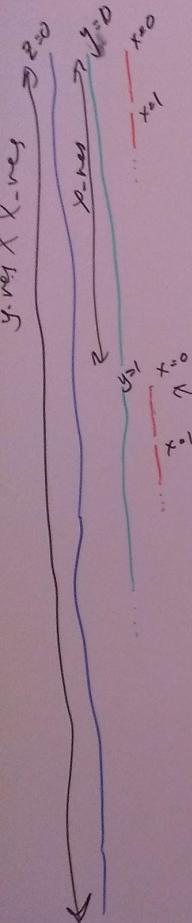
Document Started
10/26/2018

Code Started
11/4/2018

Major changes

- Arrays holding voxels (3d array ▶ 1d array)
 - flattening of the array data lessens overhead of pointers in the 3d data
 - data is almost identical but with fewer pointers involved - interface can be treated as completely transparent i.e. `get_data_by_index(x,y,z)` will find the entry for x,y,z.
 - This translation step is like $x + (y \times x_res) + (z \times y_res \times z_res)$
 - hold data as unsigned char (0-255) (state data only)
 - addition of bool, ‘mask’ which is `true` by default, and blocks the effect with the draw functions when `false`

Brief explanation of the new 1d array scheme, including the formula that I'll be using to compute the index.

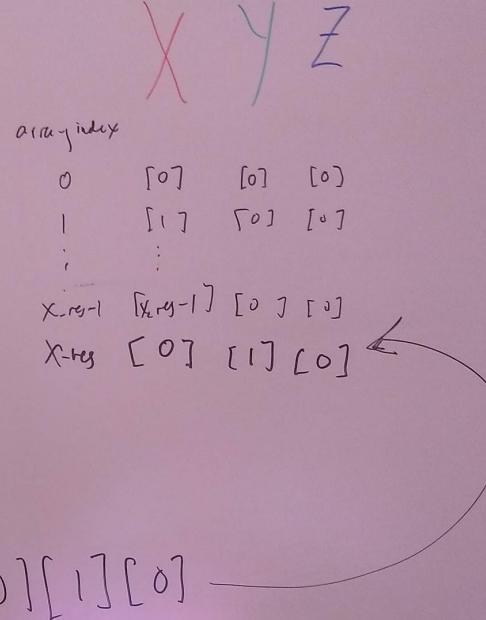


any given location is $[x][y][z]$

\otimes

$$\text{z coord} * [\text{y-res} * \text{x-res}] +$$

$$\text{y coord} * [\text{x-res}] +$$

$$\text{x coord}$$


get-data-by-index (x, y, z)

↓
compute index
↑

reference data []

is at $(0+1 * \text{x-res} + 0) = \underline{\underline{\text{x-res}}}$

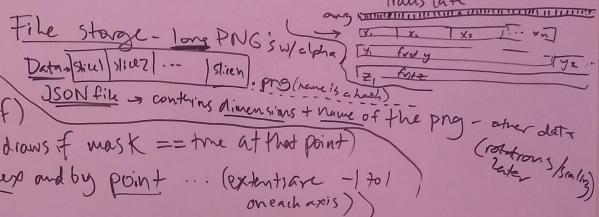
index
in 1D array

Major changes (cont)

- File storage changes
 - use formats for what they are good at
 - JSON is shit for arrays, so use an image instead
 - images are shit for holding bits of data, use JSON
 - PNG (`unsigned char`) images for block data (**LONG** images
 - supposedly there's no dimension limits, we'll see)
 - JSON file holds dimensions, filename of PNG (name based upon a hash, or md5 style 'checksum' on block)

V2.

Block storage - 3D array → 1D array with logic to
translate software representation



Block class

masking (on/off)

Drawing only draws if mask == true at that point

get/set (by index and by point ... (extents are -1 to 1

on each axis))

int
int
int → dimensions

Vox* data; → 1D array flattening the structure

Struct Vox

unsigned char state

bool mask

8-bit value 0 → 255

→ maps to a value in the palette
→ red
→ green
→ blue
→ alpha] I like the option
of a palette entry
having a little
randomness to it
(some shift in the switch
statement)

Outside air
cells
get
set
transparent
random
true

Inside air

Inside air
"warm glow"

worth thinking about

I think this could
become the basis of a
lighting system

water using
different shades/greater alpha

→ clouds

terrain

Save file restructure

→ JSON file w/ dimensions,
palette, filename of the PNG
image that holds the block

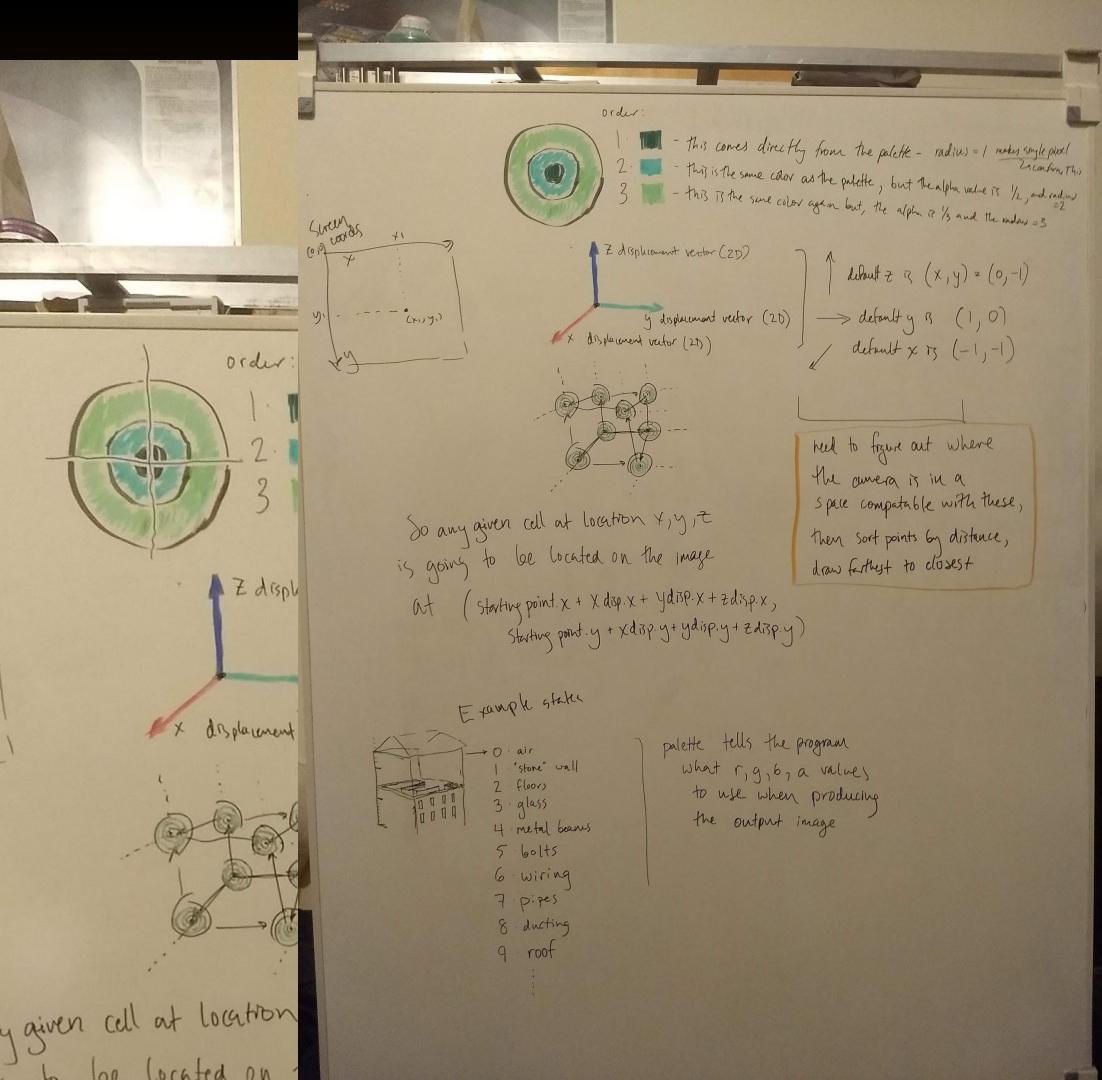
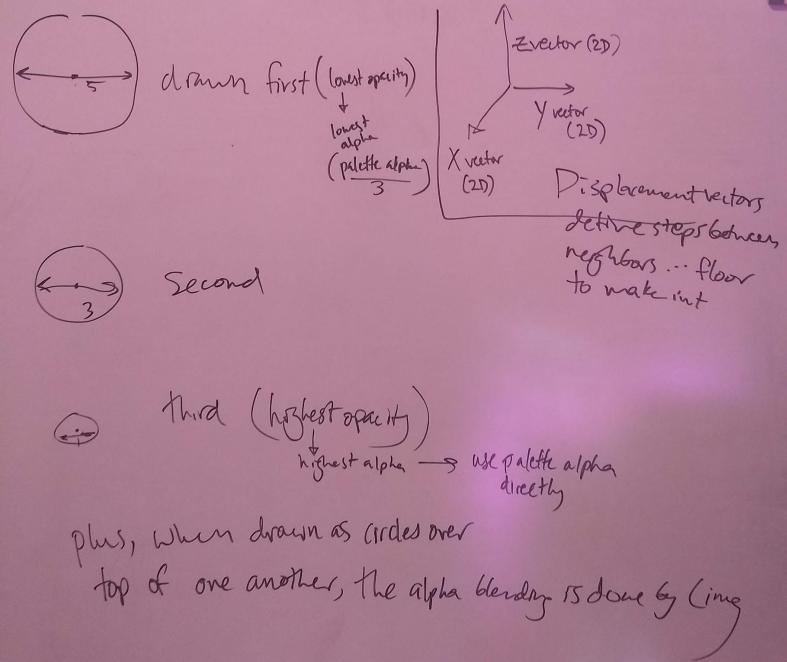
→ the image is named with a hash
or some kind of MD5 idea with
the color values in the block

Block class

→ int state
"Something else?"

→ bool mask (for drawing, not stored)

→ 1D array of
struct defined
for the voxel



Display: A word on Job and Jpoint

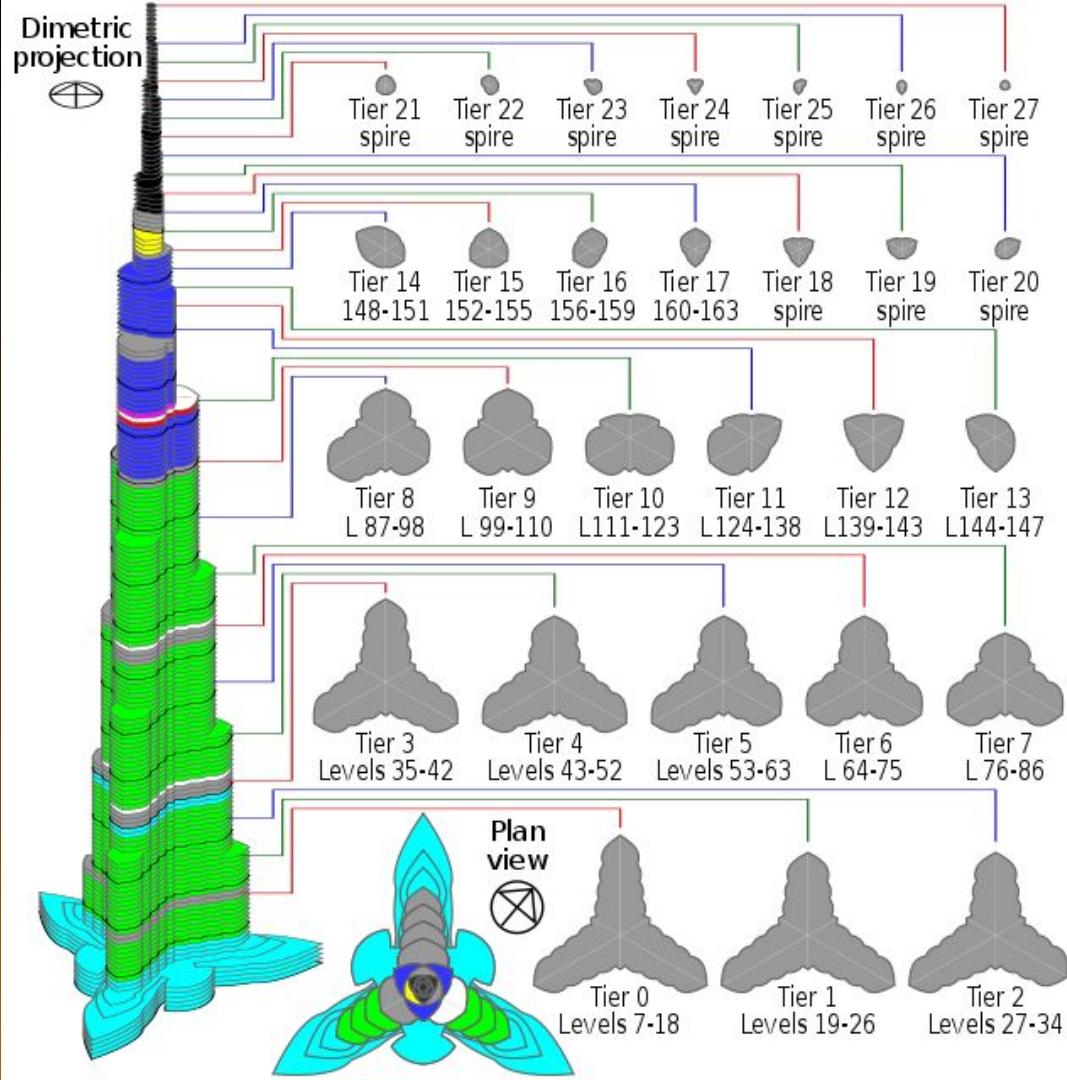
This is the upcoming work on the display function, a per-pixel raycast ordeal.

Job is a class that will compute the value of color for a point, considering many samples along a ray that extends through that pixel on the image plane (orthogonal or perspective possible based upon deflection of these rays, see other document for more details on how exactly this works)

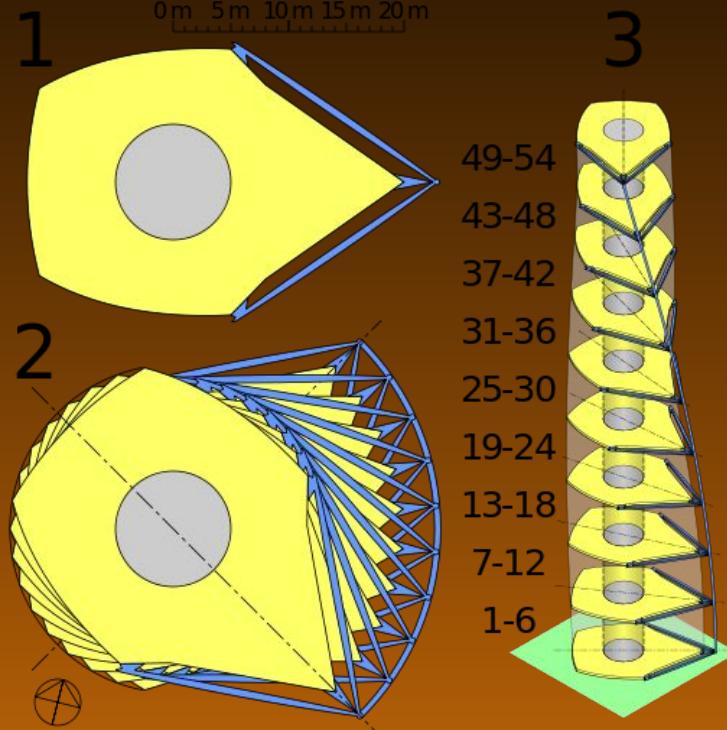
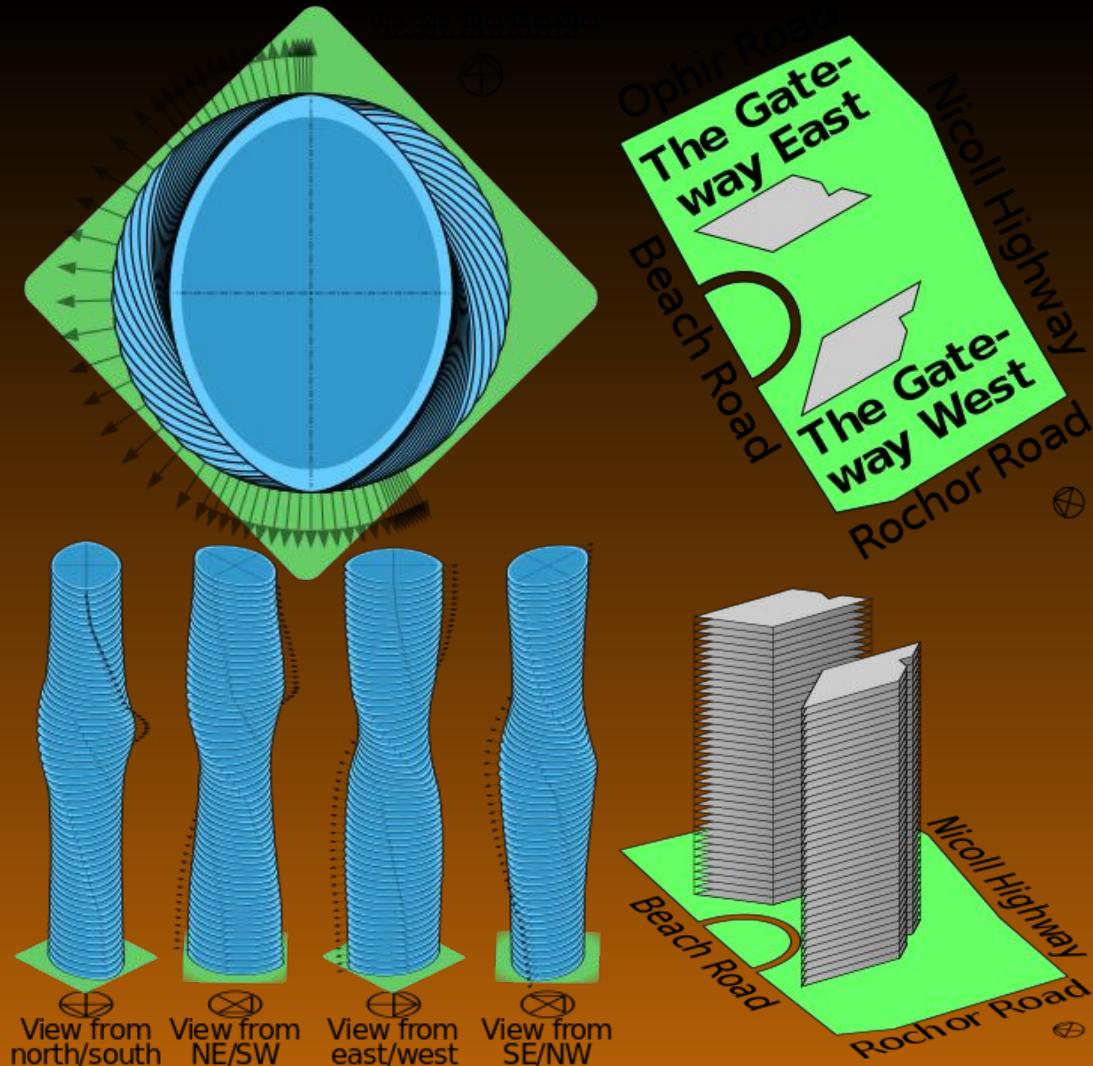
Jpoint is a supporting class that holds individual samples along the pixel's ray

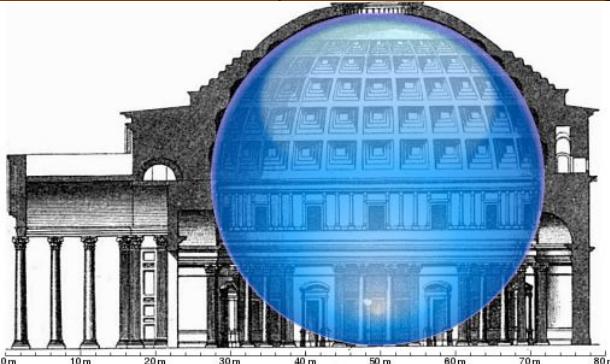
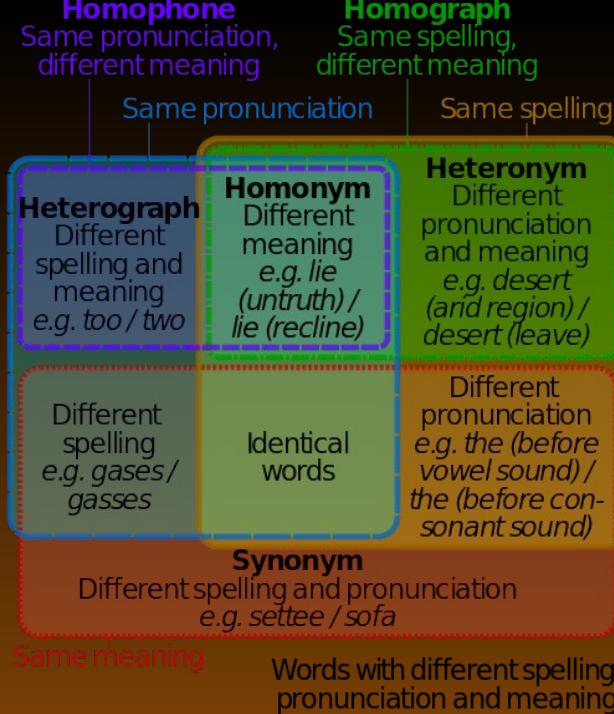
Display (Cont)

I am also considering another scheme for display which rotates (using Cimg) images including an alpha channel and stacks them up on top of one another - in what could be considered an extension of my current scheme - inspired by this illustration on the Burj Khalifa Wikipedia page by Cmglee (the original .svg is animated and slowly rotates, and mousing over a floor highlights it on the building - very wild stuff)

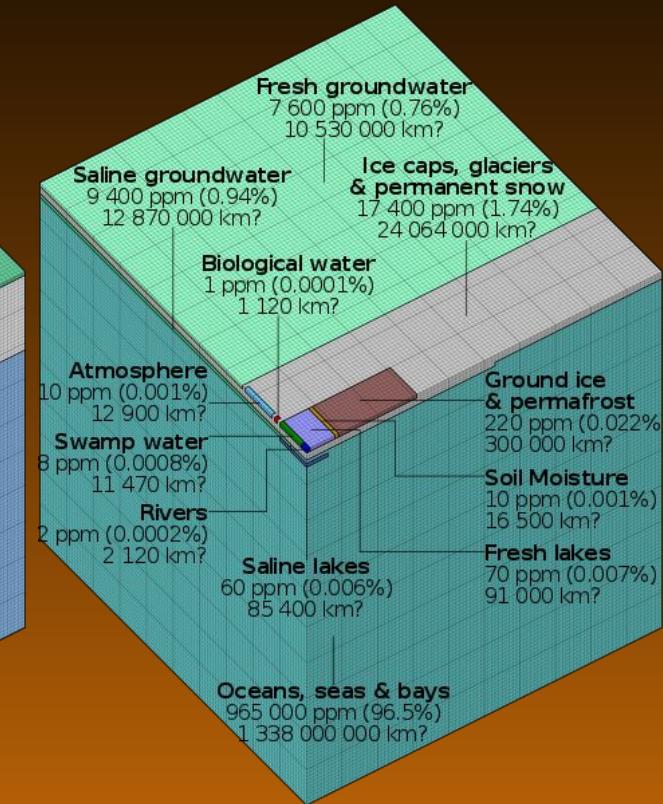
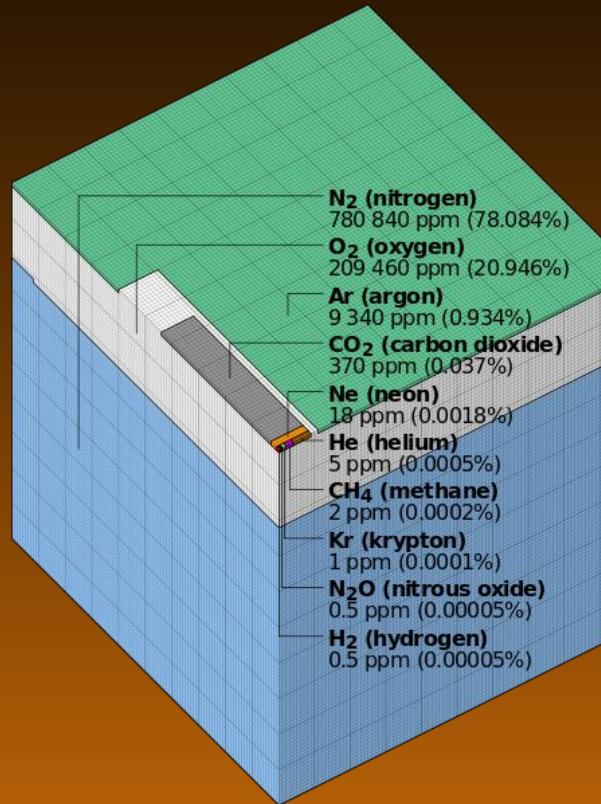


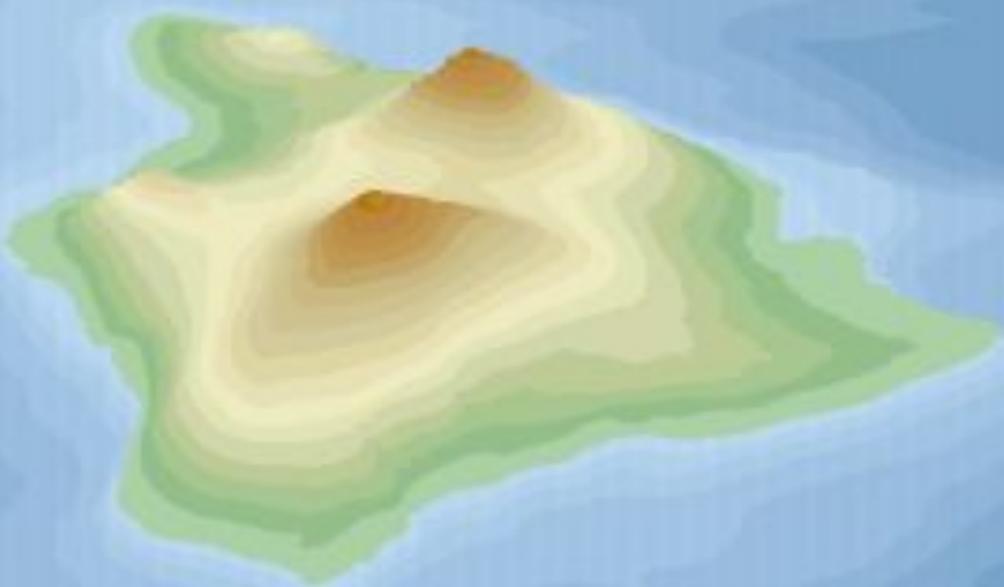
Other related works by Cmglee





Some less related works by Cmglee





Inspirational Materials

Mostly in the form of games and other software with graphical output

Other inspirational material



Simcity 4 (2003)





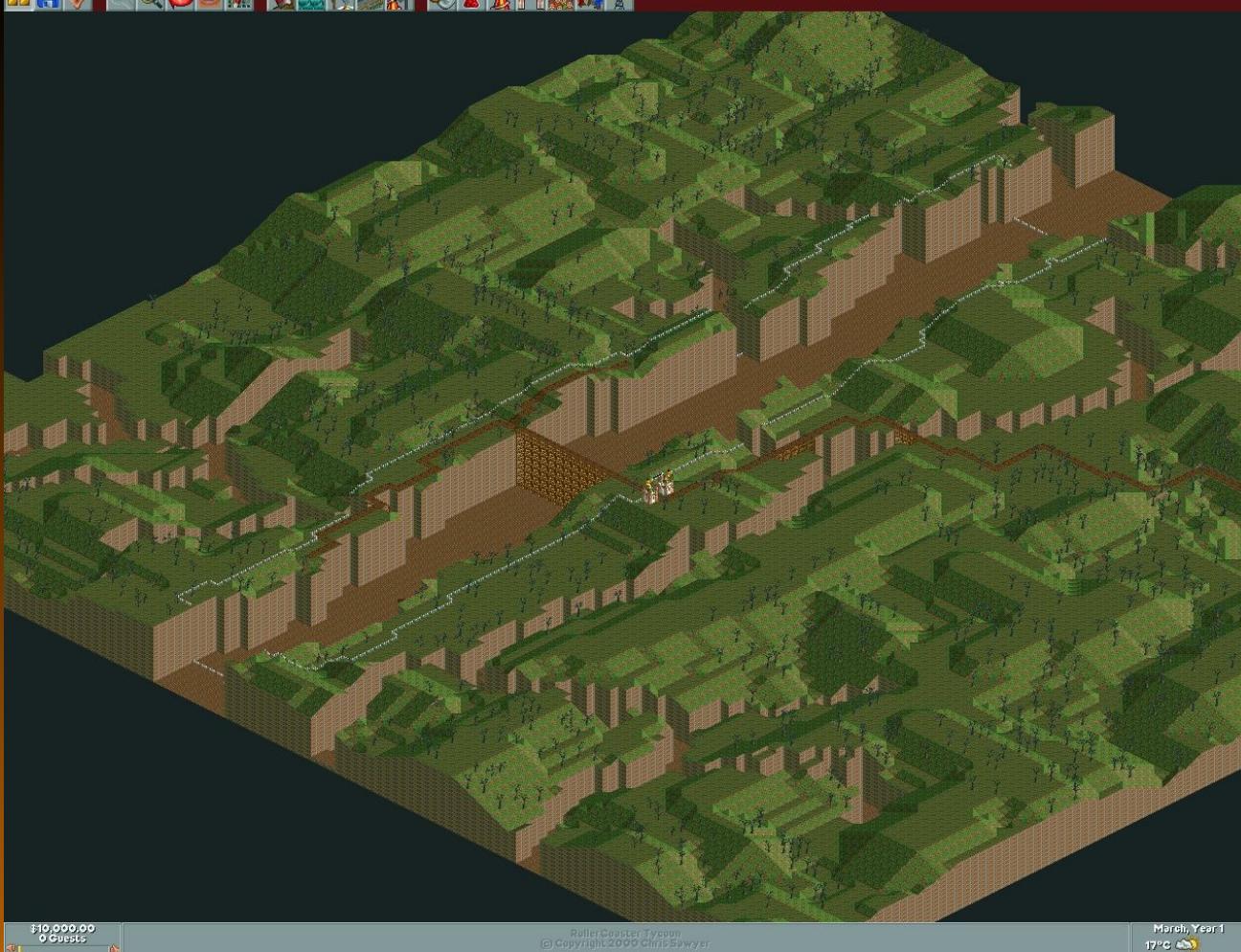
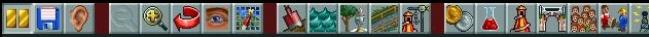
Region

2,625,322

New York







Roller Coaster Tycoon 1 and 2 - (1999) and (2002) - the pre-rendered sprites and tile-based isometric graphics will always be a major visual influence.

The ability to build underground, for tracks and paths to take on physical significance, really made for an interesting toy to interact with as a child, and even still when I played a version made for android phones again more recently. Things changed a lot with Roller Coaster Tycoon 3.









Frost Peak

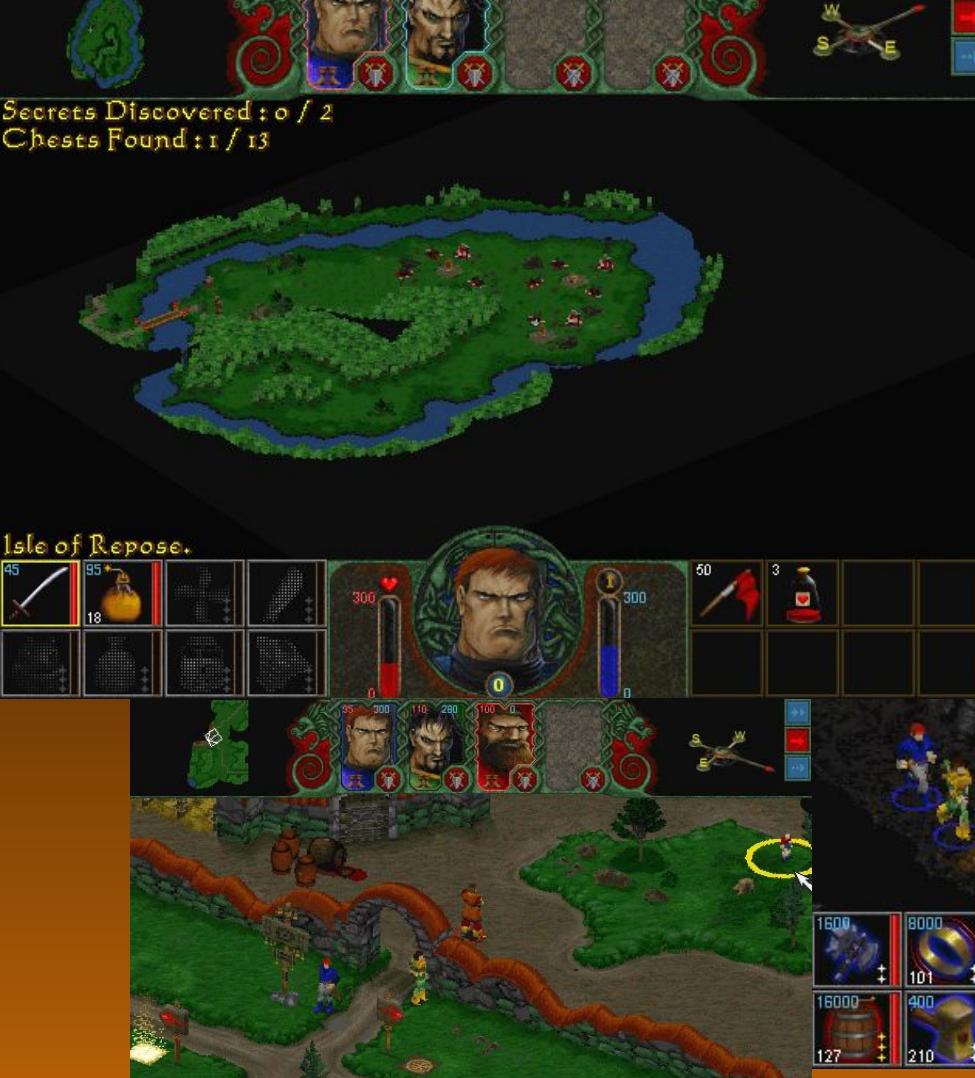




Park - Finances			
August	September	October	March
8.00	-\$2,935.00	-\$4,640.30	
8.80	-\$4568.80	-\$4564.80	
6.00	-\$979.00	-\$1,560.00	
9.90	+\$20,759.20	+\$120,694.50	+\$72.50
2.80	+\$1,118.90	+\$1,064.40	
9.00	+\$348.20	-\$323.10	
71.70	+\$656.90	+\$642.60	
3.40	+\$226.20	-\$217.70	
31.20	-\$3,281.20	-\$3,281.20	
0.00	-\$3,900.00		
3.20	-\$33.20	-\$33.20	
14.80	+\$9,873.40	+\$11,351.20	+\$72.50

Park Value: \$46,125.50
Company Value: \$99,307.50



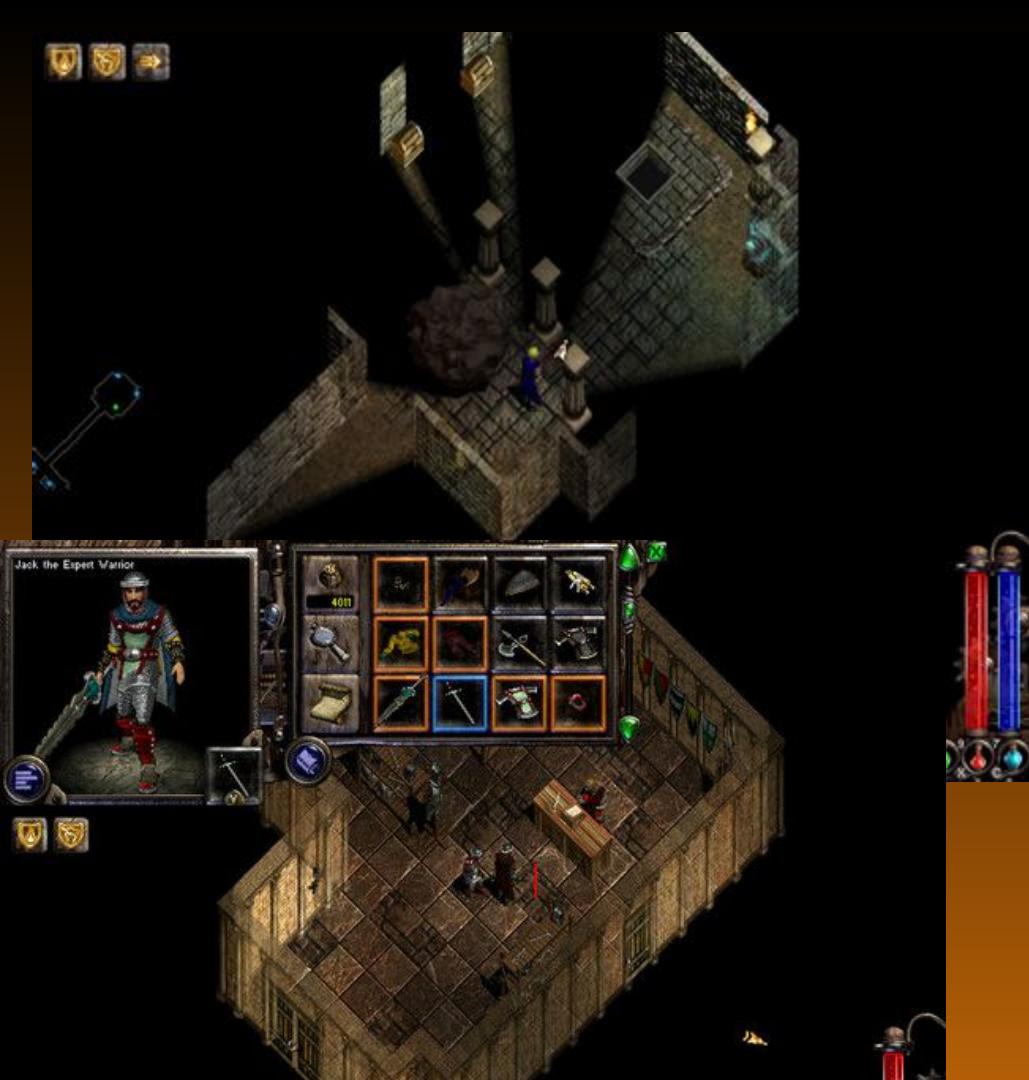


Hexplore (1998)





small voxel sprites for characters, isometric graphics allowed for 360 degree rotation around the center position



Nox (2000) not voxels, but had a very unique line of sight system and updated the character sprite/3d model in the game. Simple dungeon crawler game with RPG-style stuff going on where you kill monsters and get gold and potions, level up and get more skills for any of a couple different classes

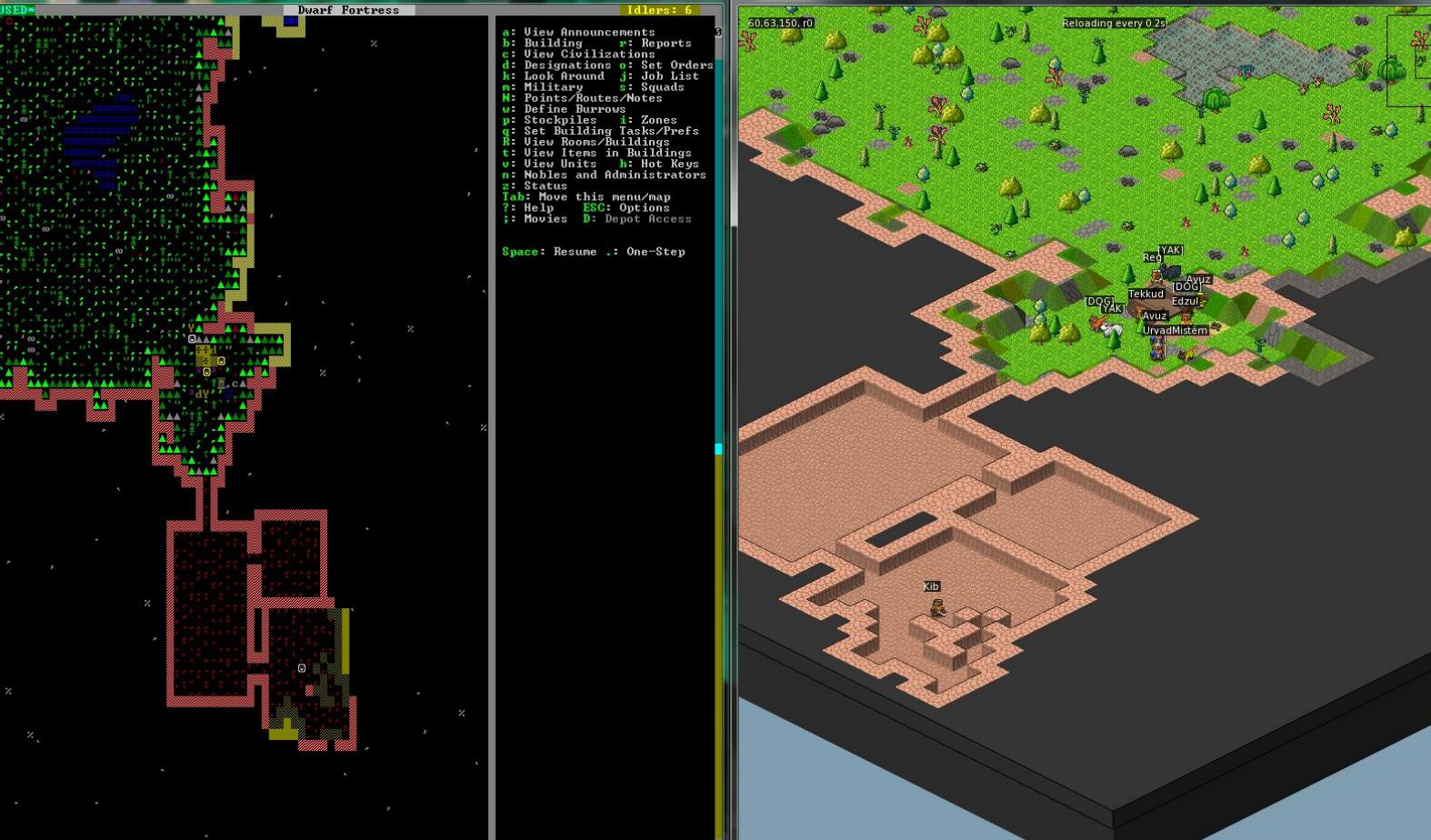


BetaBot: 65% life
BetaBot: 92% life
Battle 1 of 3 - Shot 5



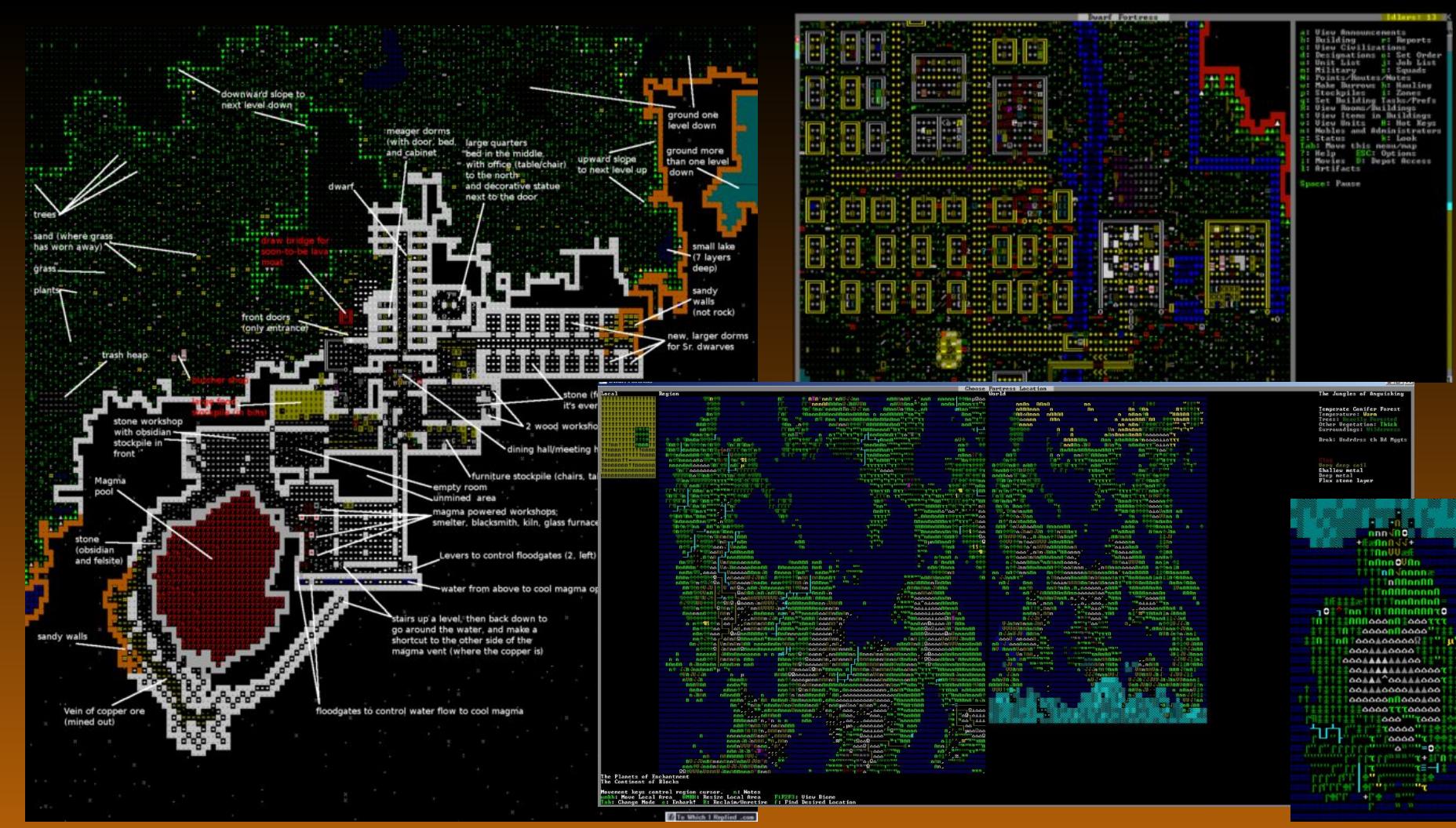
Tank/artillery games - many clones, even 3d imaginings - many different types of ammunition possible given simple terrain model that uses pixels to store the status of the terrain and destroy things within blast radii

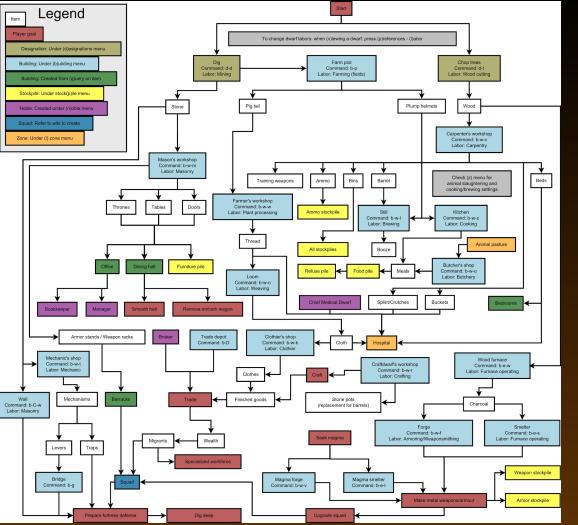
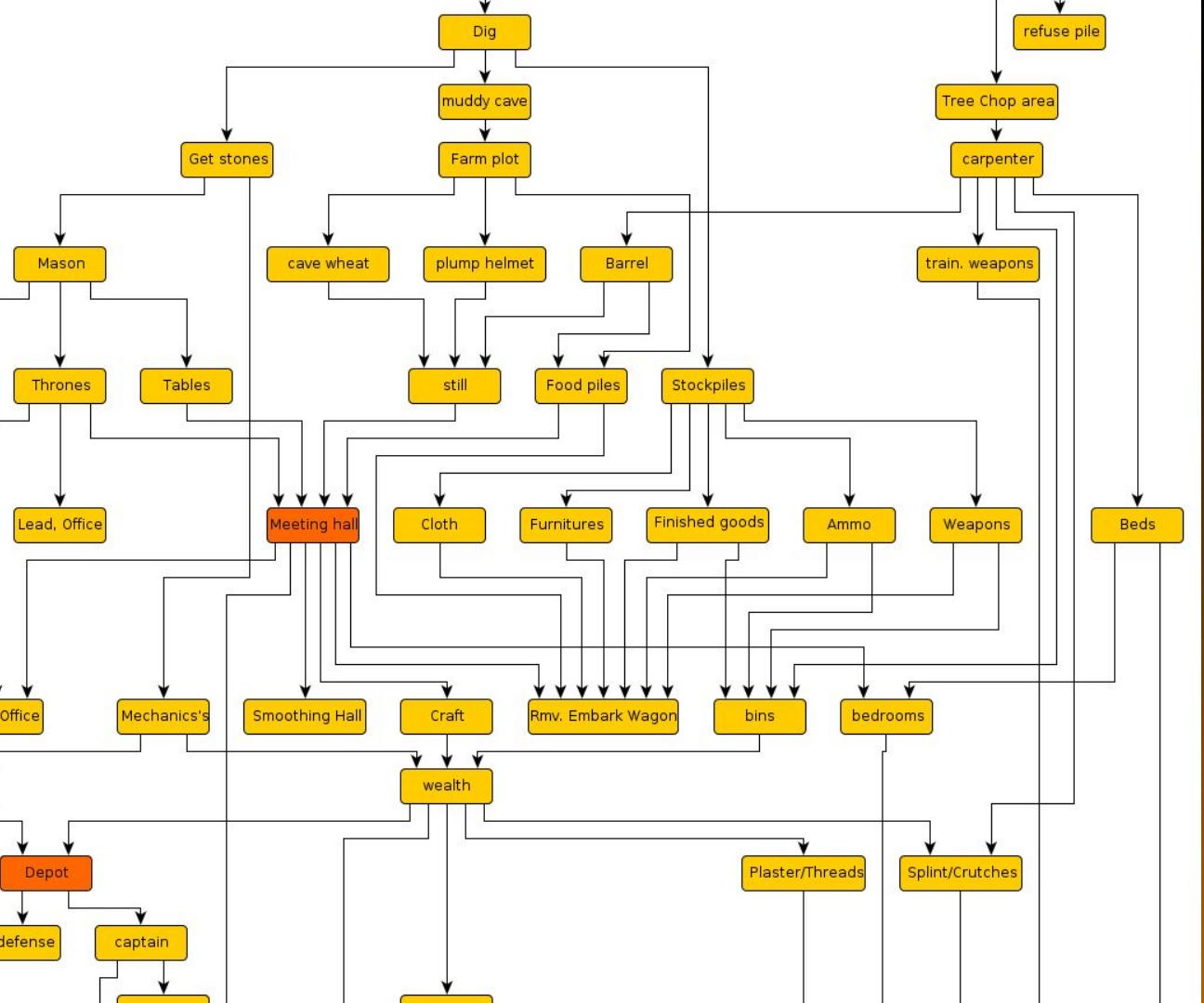




The user moves a visible slice up and down - things above the slice are not visible, and things in lower layers will be occluded if things in the visible slice are in front of them. Otherwise you can see into valleys areas further down like in the picture on the next page.

Dwarf Fortress (2006) - shown here with a graphical frontend - usually played via ascii graphics like what's on the left hand side. There is an incredibly complex world generated with a history and mythology and vast extents and varied regions. Really just a remarkable achievement in the area of simulation. It is featured in the Museum of Modern Art.





Some of the flowcharts
that are required reading
before playing Dwarf
Fortress

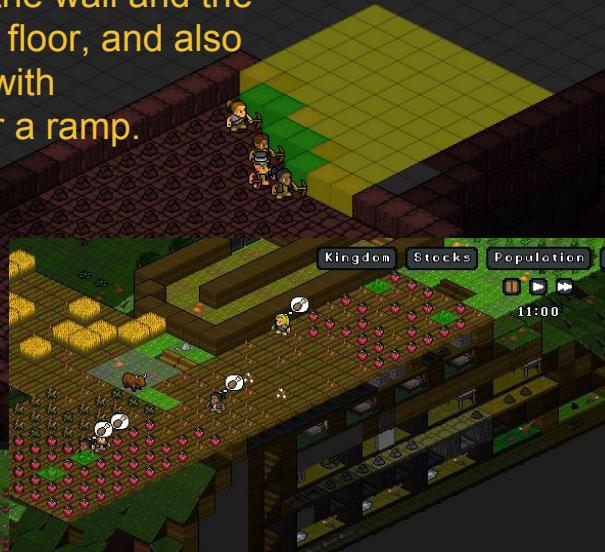
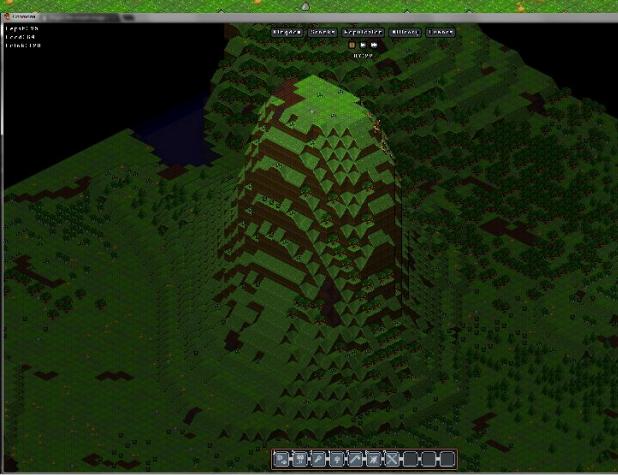
Gnomoria (2016) - a game that takes a stab at making Dwarf Fortress's ideas more accessible by adopting a heavily simplified model of Dwarf Fortress's main mechanics. I spent a lot of time playing this game and found that there are some severe limitations as you develop your world, beyond 25 gnomes really starts to come with a performance hit - effectively limiting the depth to which you can realistically explore it. Starting with simple materials and an environment with plants for food, the potential to farm and grow groves of trees as well as keep livestock, all in the name of producing enough food and drink to keep all of your 5-30 gnomes alive. A big milestone in the early game is to get a well made above some water source so there is emergency water and people stop dying of thirst. There are many resources that are farmed or collected in different ways, that might be more or less applicable to a certain set of starting circumstances.

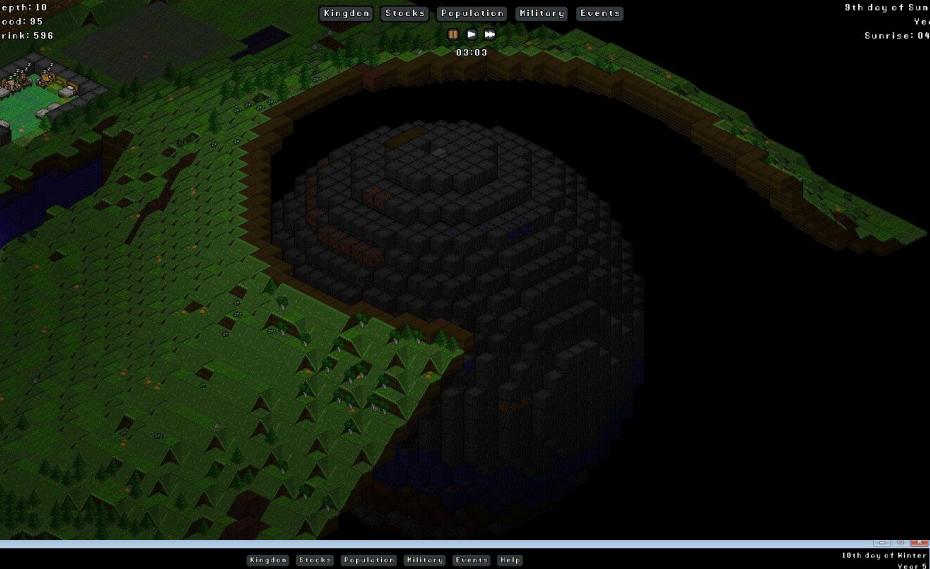


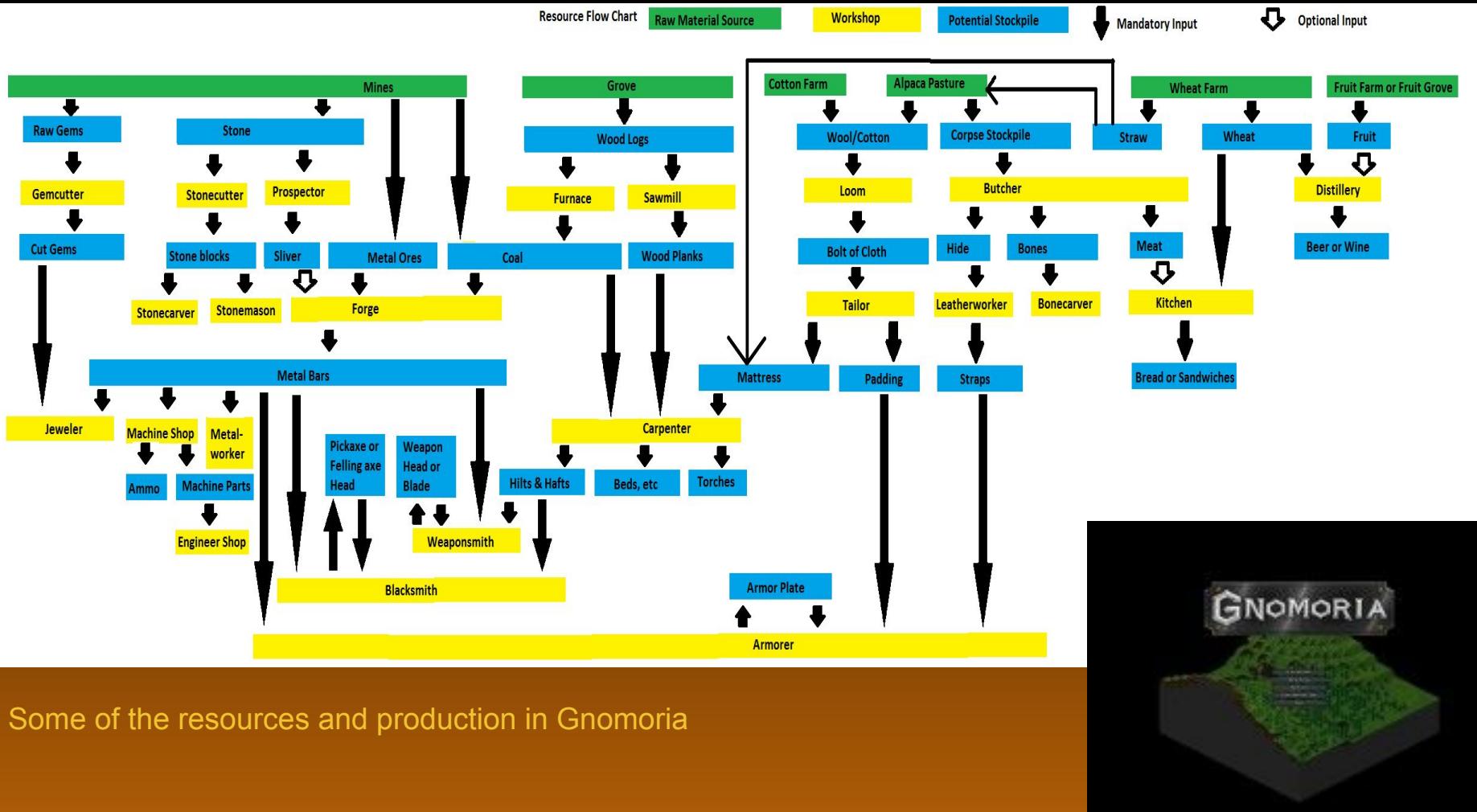
The terrain model is edited by creating a job to remove land. If you have miners assigned, they will go and mine the area you designate. There are two pieces to each block, the wall and the floor. They can dig out the walls and leave the floors, or dig down, through the floor, and also remove the wall of the corresponding cell in the floor below, or else replace it with

some stairs or a ramp.

Workshop Order







Terraria (2011) - I sunk some time into this one - It had a similar mechanic to minecraft in that the deeper you went, the better pickaxe you got, it dug faster and went through harder stone, and some of the other pickaxes were combat rewards. They used a modified model of the artillery/tank games where a 2d grid + another 2d grid for a background represented the world. It provided a lot of different 'crafting' options, where materials had a sort of well-balanced significance. Want cool bricks, or better tools/weapons? you have to dig for shit and look at ores, bring it back up and smelt bars, then use a bunch of bars to make the shit. There's armor that works the same way, too. Different zones and biomes, and a hard limitation side to side that was represented with an ocean. The display would stop scrolling when you were at the edges.



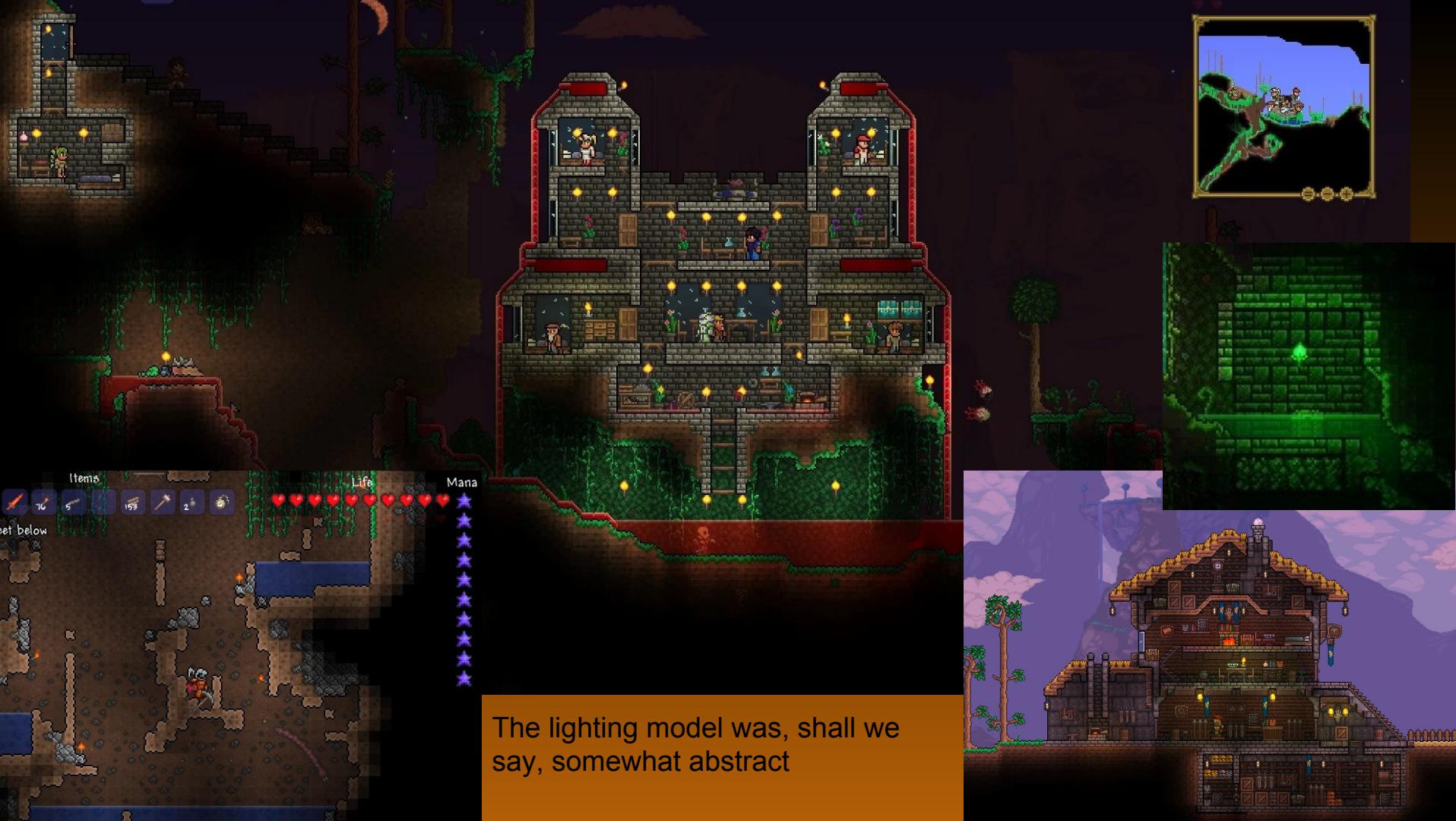




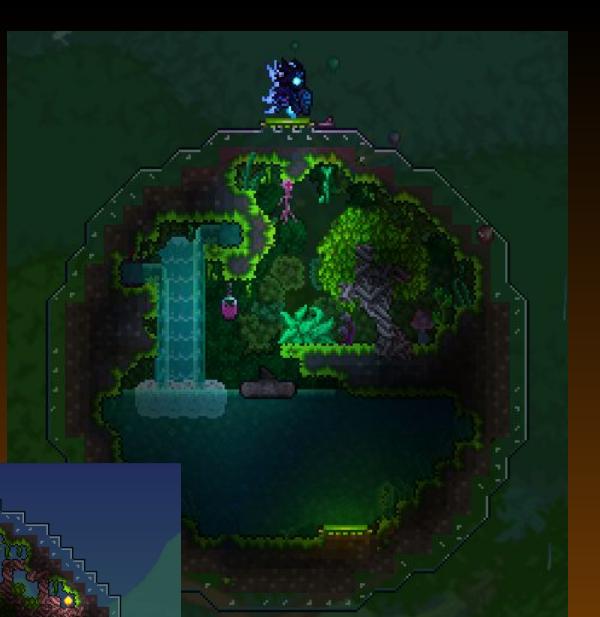
Certain biomes grew special plants and spread virally if not contained. Blocks of glass keep it from spreading in these examples, the types of systems this grid allowed for are really remarkable. Trees are simple, though, and just shoot straight up from the top of the ground, so long as nothing is above it



Vines spread to neighboring squares, so long as that square is on the bottom of something. Kind of an interesting model.

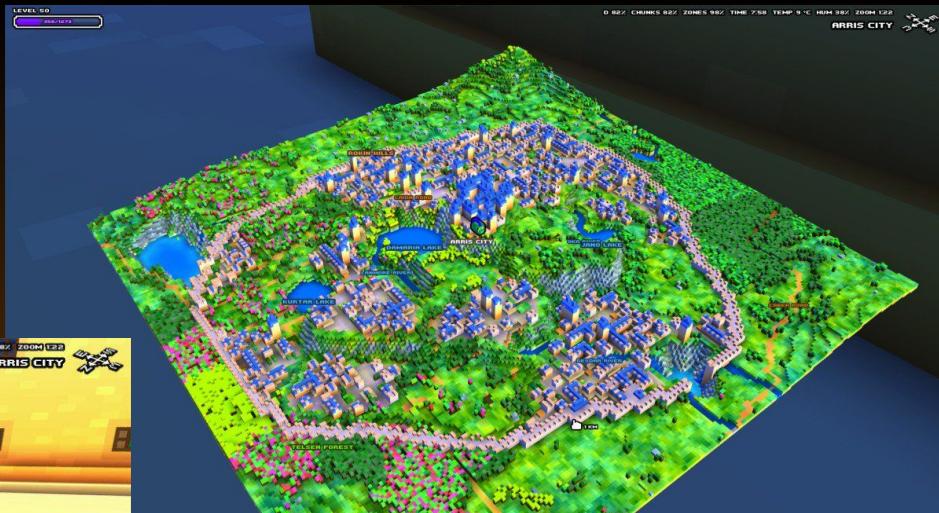


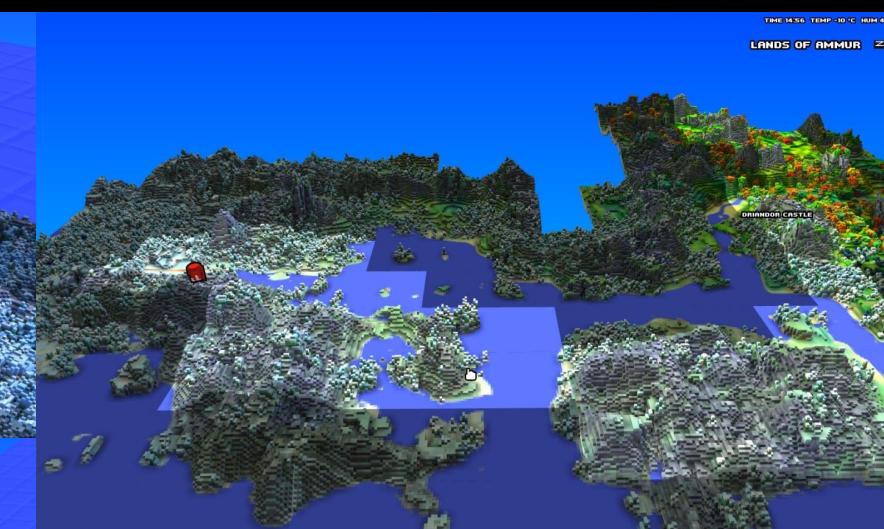
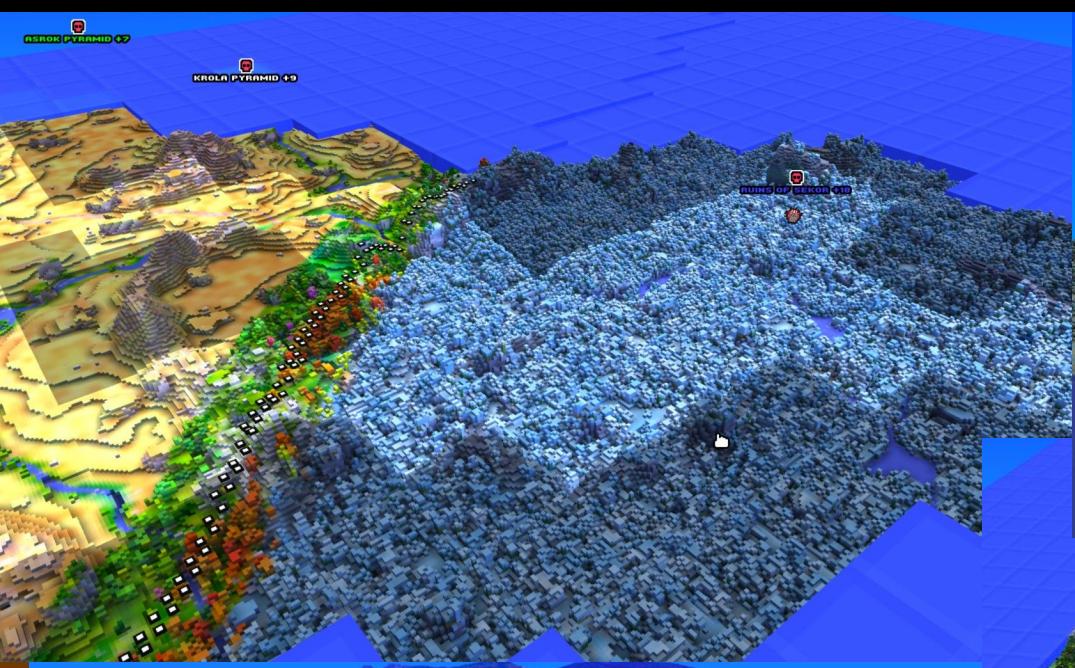
The lighting model was, shall we say, somewhat abstract



Cube World (2013) - Notably, the map

Again, I didn't play much of this one, but I thought the graphics were pretty neat. The minute to minute gameplay was a more combat-focused version of minecraft, sort of in the spirit of Terraria.

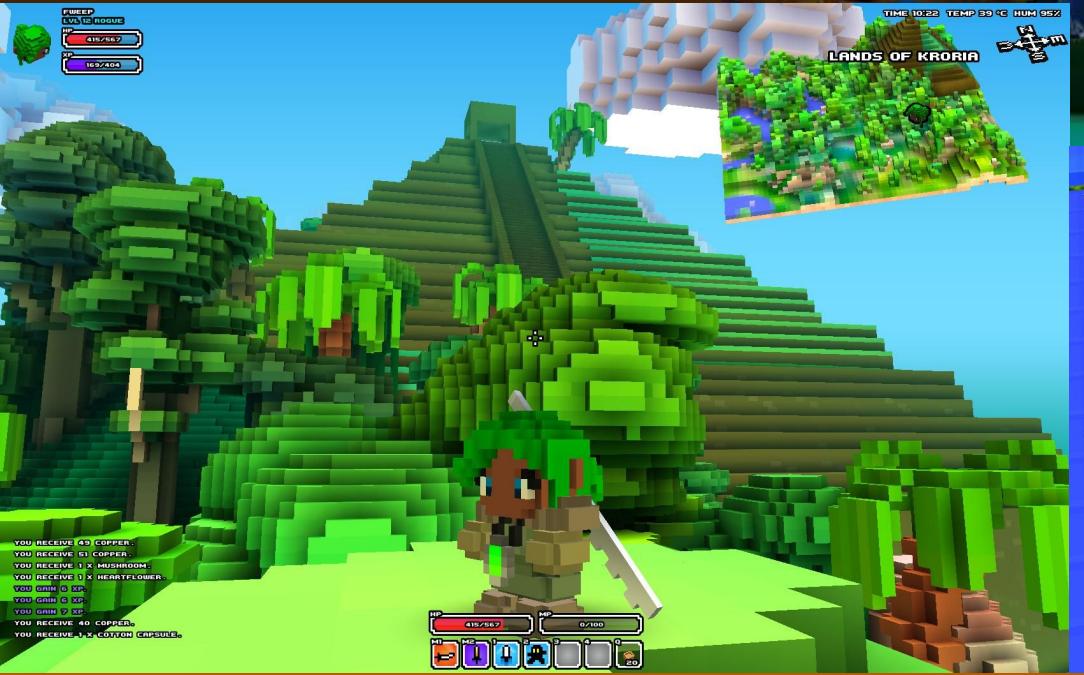


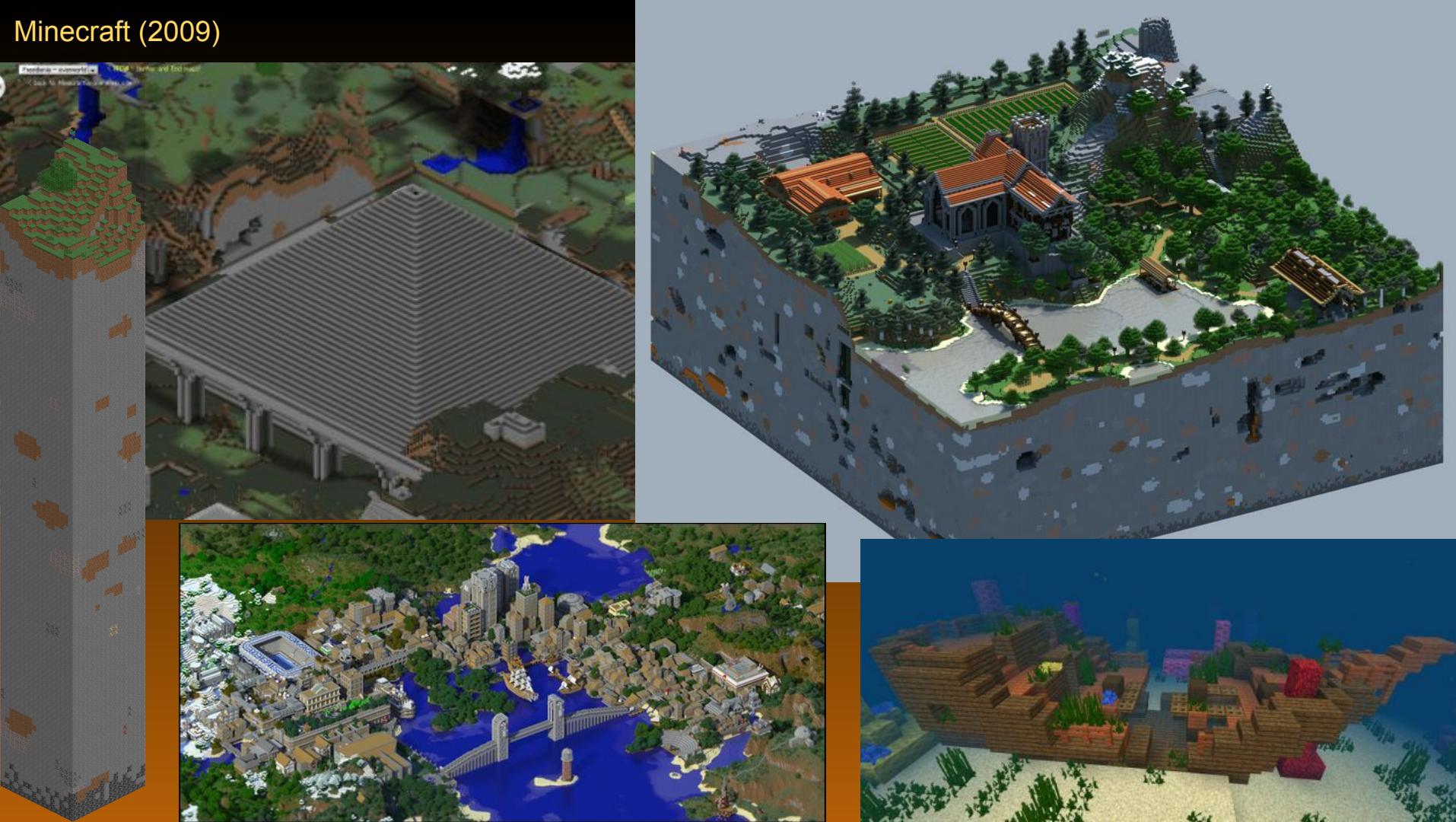


TIME 4:56 TEMP -10°C RAIN

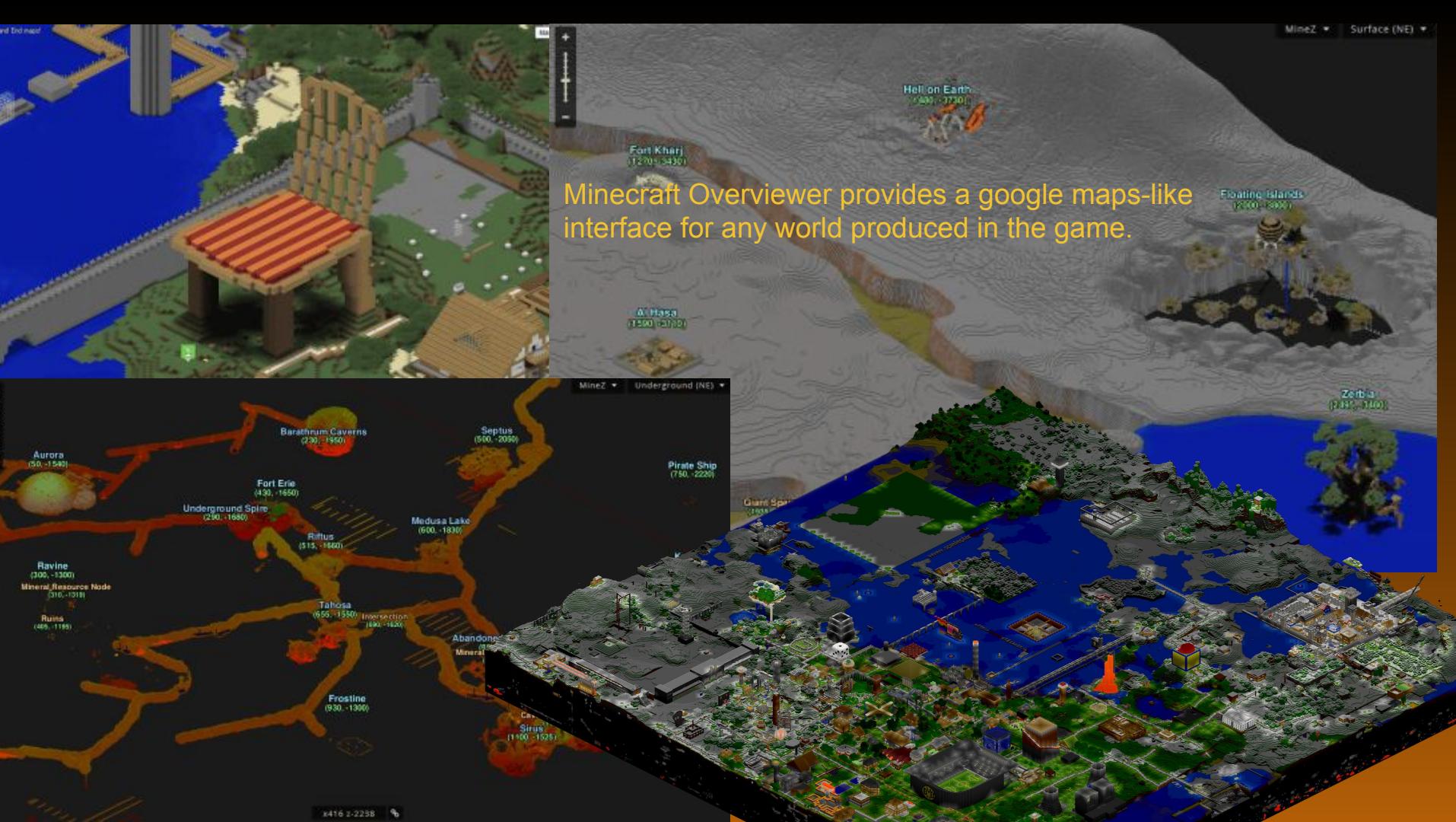
LANDS OF AMMUR Z

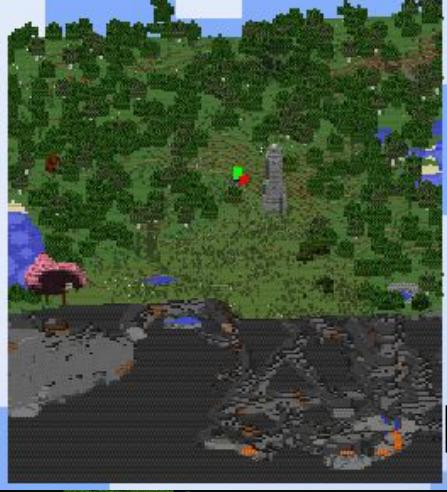
The general art style was not really my cup of tea, but I can see it had a lot of good ideas, and the map is really fascinating - the user has a tiny version all the time as a minimap that shows the local area













Oblivion (2006) - This game had a relatively quite complicated leveling system, limiting its potential for casual play. Very easily to level up the wrong way and screw yourself over by not having the right skills in later levels. The open world is all accessible from after the tutorial, and enemies scale in difficulty/type/equipment based upon your level. Amazing graphics and a huge world.





The ridiculous character creator was a big selling point



Gratuitous Space Battles (2009) - I really liked something about this game - you design ships and lay out a 2d fleet against an enemy fleet. Very hands-off in the actual battles, but I found it pretty rewarding just based upon the scale of everything. Lots of different weapons and shields/armor that are more or less effective counters for one another, really a relatively simple game.

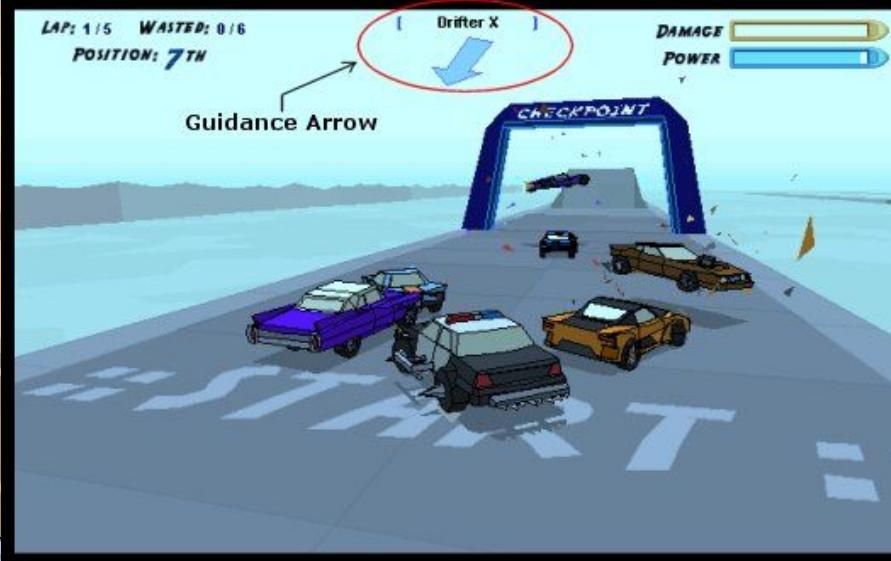




This game, I played years and years ago on miniclip, centered on the ufo that stayed a set height above the ground . your view rotated when you turned the ship, with a little banking animation. Something about the rudimentary 3d really captured me in the days of flash games. You flew around a square of suburb with blackness off the edges, picked up people and cars, dropped them off at the 'mothership'. It was called "Alien Abduction", made in 2001

Need for madness (2001) - 3d racing game done in flash

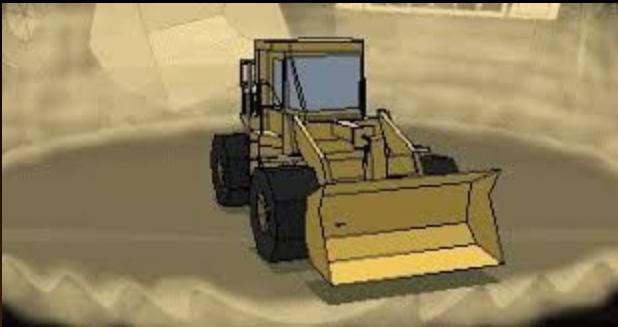




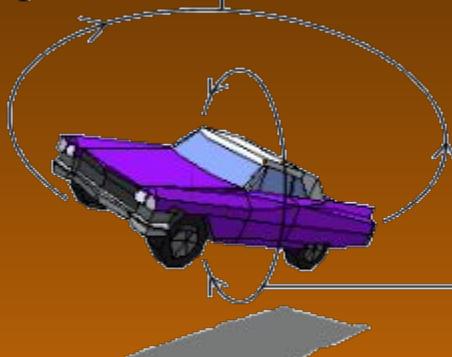




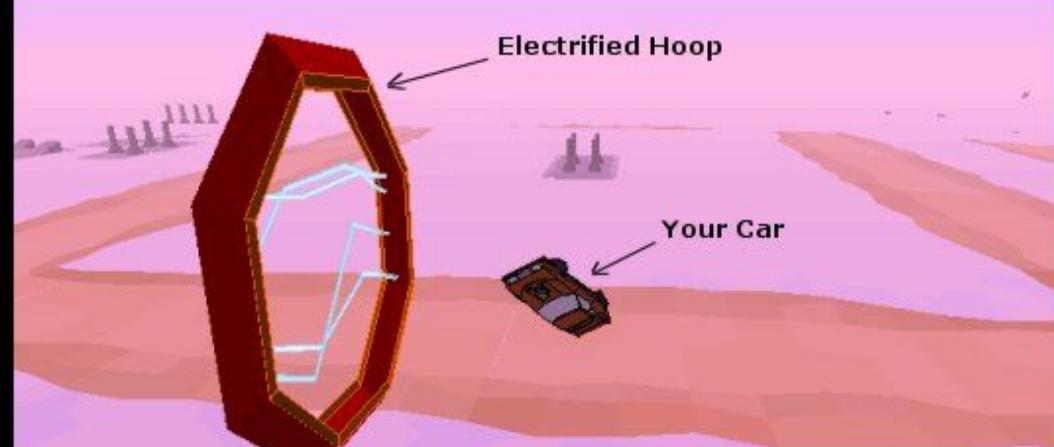
Created by Game-BeatX14 on Deviantart



Leaping



Rolling



PLAYERS ONLINE

Player	Position	Laps	Power	Damage
N.F.M.E.	1st	3/3	Max Life	Low
ELMASHER	2nd	3/3	Medium	Medium
stockcer14	3rd	3/3	Medium	Medium
nightrider	4th	3/3	Medium	Medium

Game Status: Started Created by: 582@ignacio Close X

PLAYERS

Player	Position	Laps	Power	Damage
Chim	1st	3/3	Max Life	Low
nightrider	2nd	3/3	Medium	Medium
Jelani	3rd	3/3	Medium	Medium
N.F.M.E.	4th	3/3	Medium	Medium

Live Info: STATUS: Live Total:

STAGE: N.F.M.E. - Stage 3 Laps: 3 Maximum Overfly

CHAT: (Game Chat)

Chim: Hey game so I can own yu sukers
stockcer14: with chim?
madmax: nms weedi as you know
Chim: chim is best in game
Shut up chim
madmax: er is that a car that was made in car edder

Type here... Send Message

Need for Madness 2 (2014)

the second one which gives the user an editor - plus we need to look at the drawing tutorial <http://www.needformadness.com/developer/simplecar.html> which is beautiful in it's simplicity, and really pretty amazing in its potential complexity - include examples.

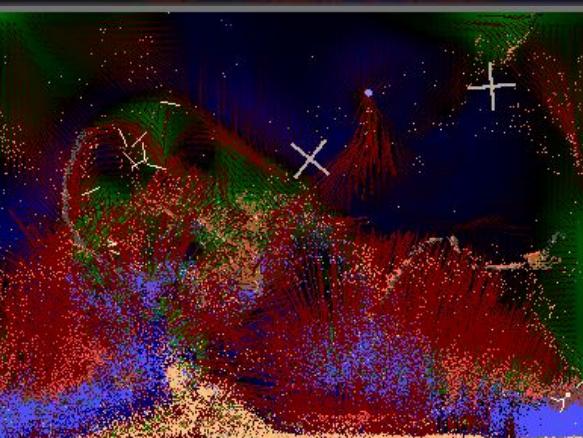
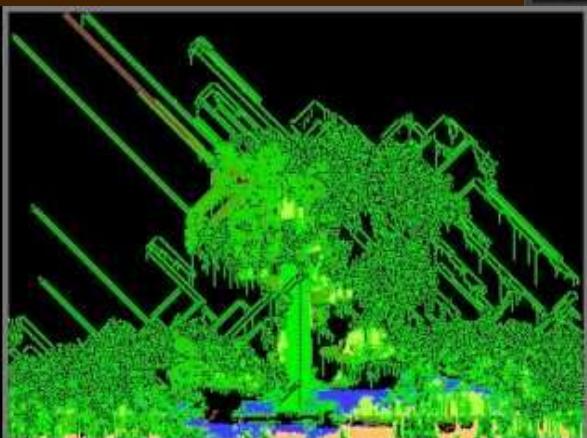
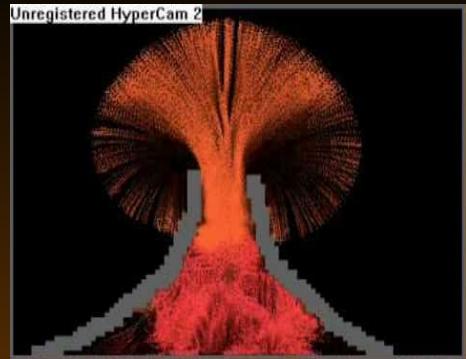
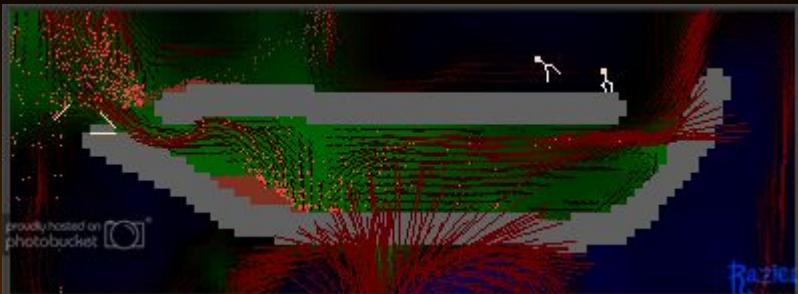
<http://multiplayer.needformadness.com/development.html>

<http://multiplayer.needformadness.com/about.html>

This makes me wonder - is a quad a more realistic primitive?



Dan Ball Dust game - pixel grid that simulates a lot of things like moving particles, air patterns, growth of plants, some cellular automata concepts. A very impressive software toy that's been in development since I was in middle school.



POWDER	WATER	SPARK	WIND	BLOCK	UPLOAD
G-POWDER	C-4	SEED	AIR	ERASE	SAVE
FIRE	STONE	BOMB	CLOUD	CLEAR	LOAD
SEED	MAGMA	LASER	BUBBLE	DRAG	MINI-MAP
G-POWDER	NITRO	VINE	BUBBLE	COPY/PASTE	HIGH-RES
FAN	HITRO	ANT	WHEEL	TEXT	MENU
ICE	ANT	SALT	PLAYER	PEN-S 8	SIDE-OFF
S-BALL	TORCH	BLACK	FIGHTER	PEN-S 8	GRID 0
CLONE	GAS	BIRD	BOX	SCALEX1	BG-LINE
F-WORKS	SOAPY	MERCURY	BALL	SPEEDX1	DOT S
SPARK	MERCURY		CREATE	STOP	RESET

POWDER	WATER	SPARK	WIND	BLOCK	UPLOAD
GUNPOWDER	C-4	SEED	AIR	ERASE	SAVE
FAN	STONE	MAGMA	OIL	CLEAR	LOAD
ICE	VIRUS	BOMB	SOAPY	DRAG	MINI-MAP
SuperBall	HITRO	LASER	THUNDER	WHEEL	HIGH-RES
CLONE	ANT	ACID	WHEEL	COPY/PASTE	MENU
SPARK	TORCH	BLACK	PLAYER	TEXT	SIDE-OFF
STONE	MERCURY	BIRD	FIGHTER	PEN-S 3	GRID 0
NITRO			BOX	SCALEX1	BG-LINE
ANT			BALL	SPEEDX1	DOT S
			CREATE	STOP	RESET

POWDER	WATER	SPARK	WIND	BLOCK	UPLOAD
FIRE	SuperBall	MAGMA	AIR	FIGHTER	SAVE
CLONE	STONE	VIRUS	DRAG	BOX	LOAD
SEED	Fireworks	NITRO	WHEEL	WHEEL	MINI-MAP
GUNPOWDER	OIL	ANT	PLAYER	TEXT	HIGH-RES
FAN	C-4		FIGHTER	PEN-S 3	MENU
			BOX	SCALEX1	SIDE-OFF
			BALL	SPEEDX1	GRID 0
			CREATE	STOP	BG-LINE
					DOT S
					RESET

314fps dot1499

DAN-BALL.JP

(C) 2007 ha5511

16fps dot1001

DAN-BALL.JP

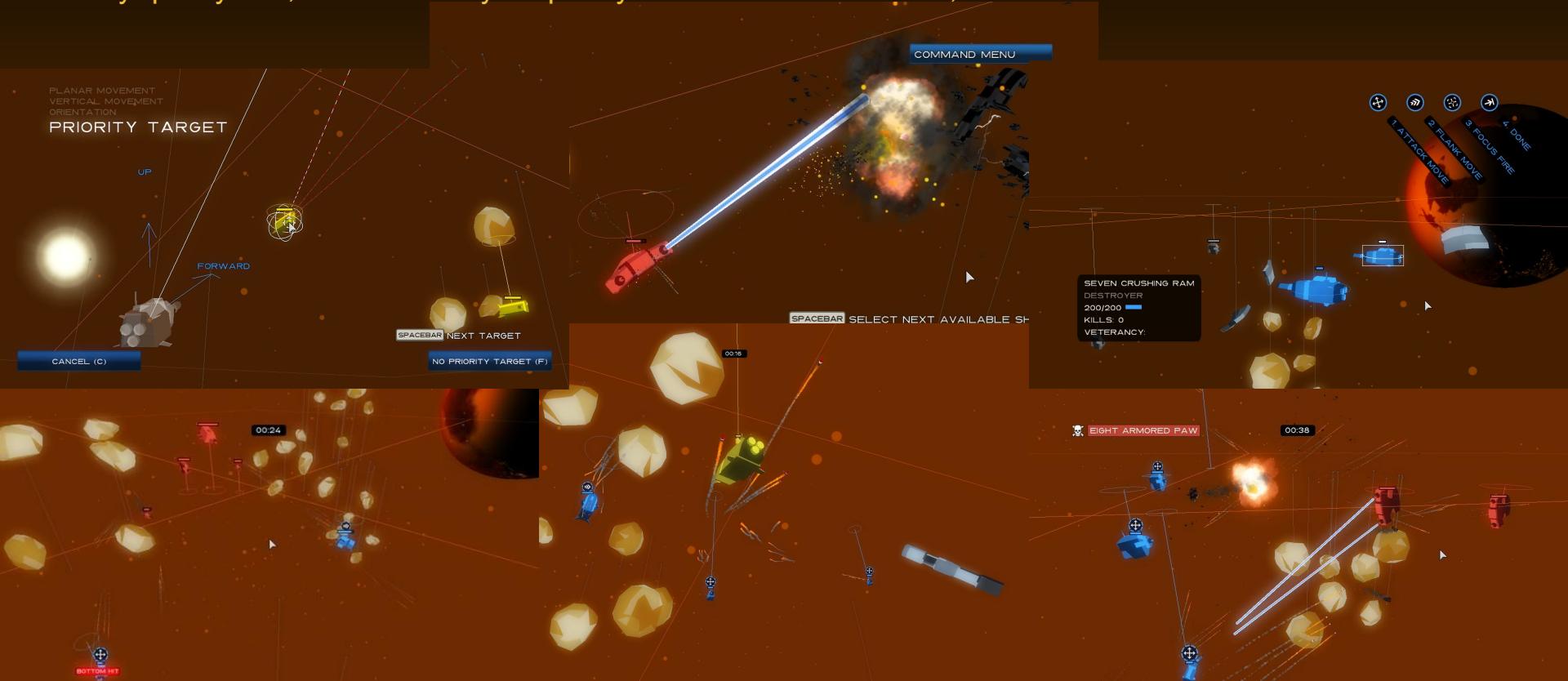
(C) 2007 ha5511

Dungeon Keeper (1997) -

There's something I really like about the softness of the graphics, and the limited color depth. I never really played any of this game.

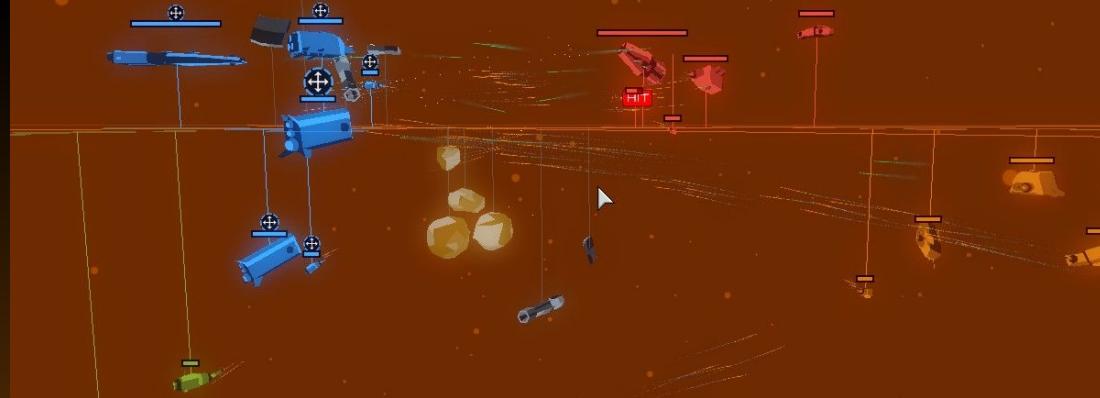


Flotilla (2010) - Unique combat system frequently paused realtime events to allow the user to change the angle and speed of the ship, fire weapons, roll or evade, and projectiles would slowly track through space or cut through an area in the case of lasers, allowing for some interesting variations in gameplay. This system allowed for two or more users to play, by simply allowing them to each take turns before combat resumed. It had a very good, simple arcade-y quality to it, with the ability to quickly make random matches, etc.



COMMAND MENU (F)

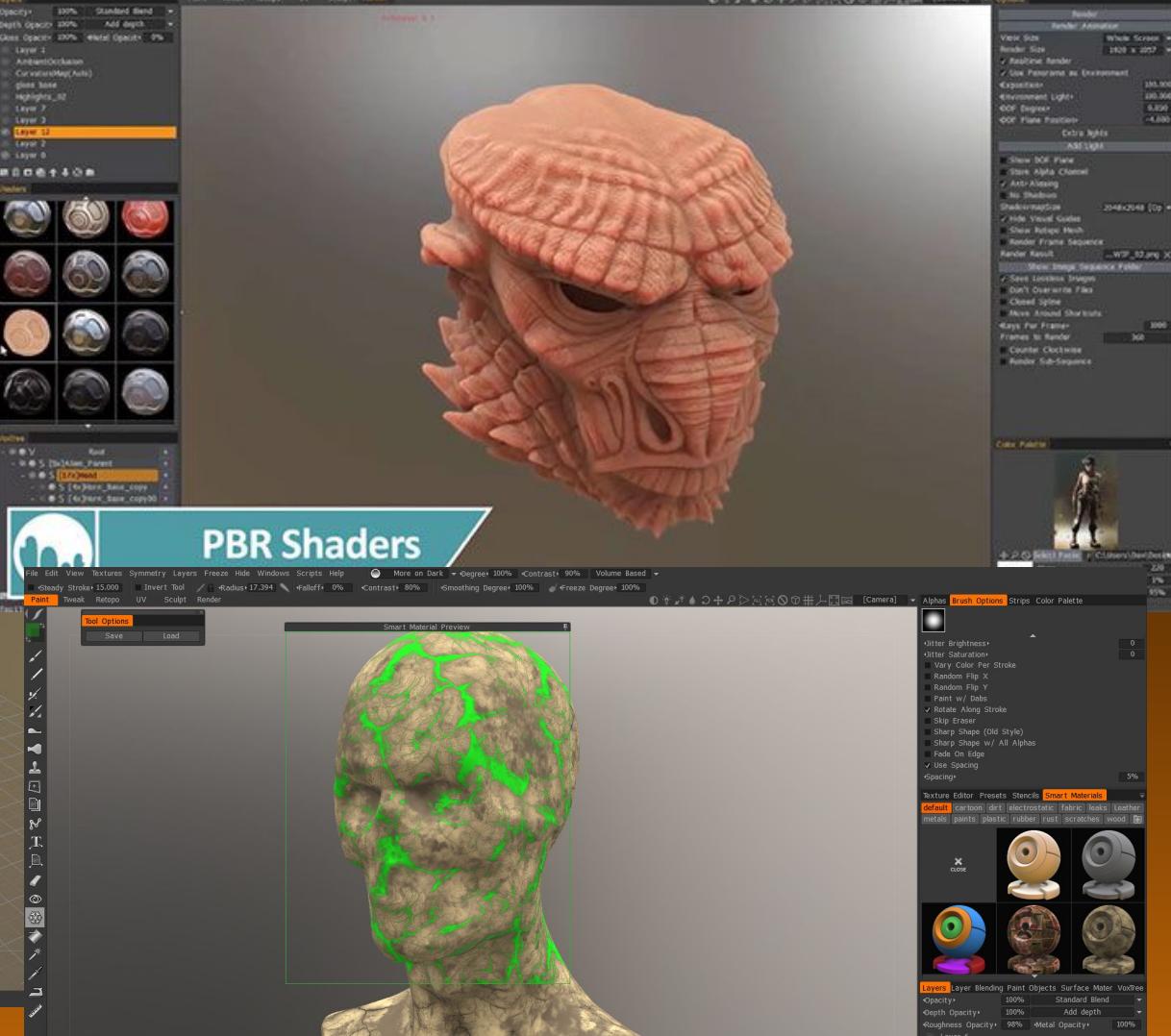
Armored sides of some ships would deflect projectiles, if facing the right way



Bottom hits are critical, and do more damage - similar to the idea of flanking - it's tricky though because they roll faster than you move



3DCoat (2007) - voxel sculpting 3d modeling software - I played with this very briefly, but the idea just always seemed really interesting.



Starfighter: Disputed Galaxy (2007) by Ben Olding
http://kongregate.wikia.com/wiki/Starfighter:_Disputed_Galaxy

https://www.youtube.com/watch?v=cmYqMd_NZKs
I want to document the major gameplay elements to try to clone it in 3d at some point down the road.

This was a really influential game for me in middle school. The limited sight distance provided by the rectangular viewing area is really something that 3d reckonings have largely missed. I think it could be achieved by displaying the ship inside of a volumetric sphere, upon which various information is displayed, similar to the arrows of SF:DG

Another idea is to extend the galaxy into the third dimension and add layers - use the elipsoid function to compute the regions of distance from the galaxy center - some sectors have friendly space stations, some have black holes, some have enemy space stations of a whole bunch of asteroids to mine. If the view was limited to a sphere with a grid overlaid, I think a similar sort of effect could be achieved to what was done in SF:DG

As you can see below - the sprite for the ship within the game is changed based upon what equipment is on it. Primary weapons usually go under the wings.





Showing the UI for when you dock with a space station on the left, and mining an asteroid on the right. The space station glows red for aliens, blue for humans. Sectors are numbered with an x and y coordinate, and have different contents based upon what is in the grid. The circles are smaller space stations with a single defense turret, while the triangles are larger space stations that have four of these defense turrets. Ones with small collections of grey rocks are sectors that provide a large number of asteroids for players that want to make money with a ship set up for mining. Mining requires a ship with a mining laser, with the mining laser selected, in proximity to an asteroid. By firing the laser, the ship gathers material until the capacity is full (this is a very small ship, so it probably only holds 100 or so - the large ships that are more suited to this activity have between 3 and 5 thousand).



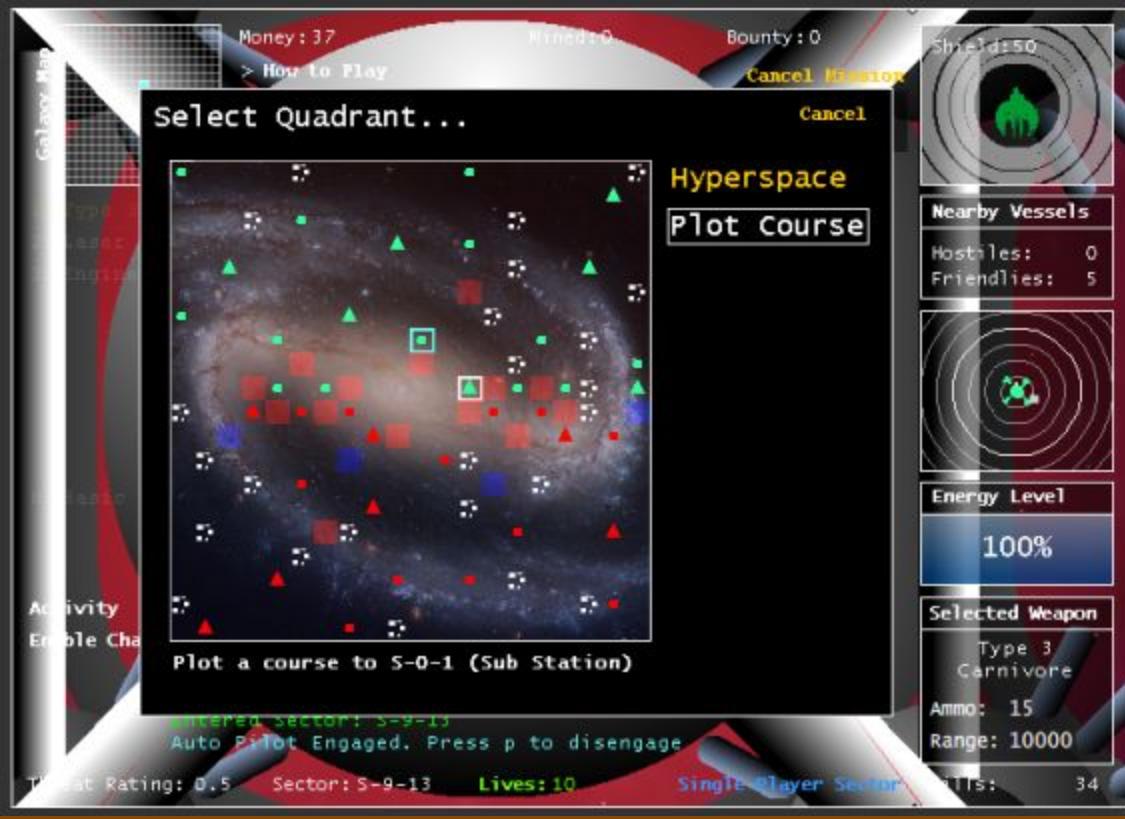
Some elements of the space station ship customization UI: on the left is a basic ship, the right is a ship you don't get for a long time into the game. The basic ship only has two regular weapon slots, one utility slot and a basic mining laser slot. The Warship has 5 regular weapon slots, 2 utility slots, a proximity slot (bubbles of damage or EMP around the ship - close range defensive) and a large slot. The large weapons are treated differently than any other weapons, as it is purchased as a single unit of ammo. Every ship has options for engines, which make the base speed higher, or add to the boost speed, or both (the boost is used by hitting shift to spend 35% energy and go to 130-200% speed until you let off the forwards arrow - your speed decreases quickly, with some notion of 'friction').

Available Missions		Sector S-15-19	
Type	Mission	Reward	
Courier	Transport some construction drones from Sector S_18_19 (3 sectors away) to Sector S_15_19 (3 sectors journey from pickup)	1147	Accept
Assassinate	Terminate enemy Striker in sector S-14-19 (1 sectors away) and report to station in S-15-19 (1 sectors)	2530	Accept
Assassinate	Terminate enemy Fighter in sector S-16-18 (2 sectors away) and report to station in S-15-19 (2 sectors)	290	Accept
Assassinate	Neutralise enemy Protector in sector S-17-19 (2 sectors away) and report to station in S-18-19 (1 sectors)	530	Accept
More Missions >			
Cancel		Money: 2500	

To the right, we see a basic ship having just launched from one of the larger space stations, which have four defense turrets.

To the left here, the randomly generated mission selector is shown. You can only have one mission at a time - they are often multiple sectors away, and in the case of courier missions, you have quite a trip ahead of you. The most lucrative missions are multiple assassinations, which have you go to a sector, kill everything there, and come back. Once you get missions to kill multiple warships, you can see bounties north of 35k.





The hyperspace menu allows you to travel to a distant sector in a few seconds. There is an animation that plays then the target sector loads. The hyperspace charges are expensive or you can buy an engine with a hyperspace recharger that will produce a charge you can use about every minute.

Below you see a person that had an encounter with a number of hostiles and was killed - when the player kills enemies, you get a bounty based upon the type of enemy and the threat level of the sector. Threat levels are established by vertical position in the galaxy grid - they represent a sector being more or less strongly alien or human controlled. The bounty, along with your mining material is turned into money when you dock at a friendly space station.





Human ships (top) and alien ships (bottom) all shown approximately to scale



Buy Weapon

Sector S-10-4

Weapon	Ammo	Info	Price	Buy
Type 1 Stinger Torpedo	20	Info	250	Buy
Type 2 Stinger Torpedo	15	Info	300	Buy
Photon Bomb	Inf	Info	1000	Buy
Plasma Cannon	Inf	Info	2000	Buy
Laser Beam	Inf	Info	3000	Buy
Type 3 Stinger Torpedo	15	Info	500	Buy
Electrostatic Orb	10	Info	300	Buy
Positronic Convergence Disc	10	Info	1100	Buy
Javelin Torpedo	15	Info	100	Buy
Thunder Bolt Torpedo	1	Info	1400	Buy
EMP Torpedo	1	Info	1300	Buy
Shield Extraction Beam	Inf	Info	1500	Buy
High Density Photon Bomb	Inf	Info	1500	Buy
Type 4 (Stealth) Stinger Torpedo	15	Info	1000	Buy
Long Ranger Laser Cannon	Inf	Info	1000	Buy
AT Torpedo	20	Info	250	Buy
LR Photon Bomb	Inf	Info	2500	Buy
Reverse Laser	Inf	Info	800	Buy
Cancel				

Money: 5343168

Buy Weapon

Sector S-2-6

Weapon	Ammo	Info	Price	Buy
Photon Bomb	Inf	Info	1000	Buy
Plasma Cannon	Inf	Info	2000	Buy
Laser Beam	Inf	Info	3000	Buy
Xandelevium Heat Disc	15	Info	900	Buy
Javelin Torpedo	15	Info	100	Buy
Thunder Bolt Torpedo	1	Info	1400	Buy
EMP Torpedo	1	Info	1300	Buy
Xandelevium Blaster	15	Info	1100	Buy
Damaging Combo Beam	Inf	Info	700	Buy
Shield Extraction Beam	Inf	Info	1500	Buy
Type 1 Carnivore Torpedo	20	Info	250	Buy
Type 2 Carnivore Torpedo	15	Info	300	Buy
Type 3 Carnivore Torpedo	15	Info	500	Buy
Disruptor	Inf	Info	1000	Buy
Type 4 (Teleporting) Carnivore Torpedo	15	Info	750	Buy
Long Ranger Laser Cannon	Inf	Info	1000	Buy
Hornet Torpedo	10	Info	250	Buy
Reverse Laser	Inf	Info	800	Buy
Cancel				

Money: 1879073

Showing human and alien weapons - there is some variation, I have gathered up all the information available on jestertrek.com that seeks to characterize all the elements of the game and give new players a good sense of what's going on. This is a little bit outdated, as you can no longer play the game in any real way due to a number of attacks that forced the shutdown of the login server a couple years ago. The best you can do is 'play as a guest' but it won't track your progress and that's not really practical when you can sink hundreds of hours into this game.

Buy Weapon

Sector S-10-4

Weapon	Ammo	Price	Buy
Energy Extraction Beam	Inf	1200	Buy
Tractor Beam	Inf	700	Buy
Magnetic Mine	5	300	Buy
LBSS Area Stealth	1	800	Buy
LBSS Stealth System	1	1200	Buy
Shield Bubble	1	1000	Buy
Energy Cell	2	1000	Buy
Teleport Disc	3	500	Buy
Holographic Disguise	1	2000	Buy
Rapid Shield Recharger	1	600	Buy
LASS Stealth System	1	3400	Buy
Inverse Gravity Field Generator	1	1000	Buy
Field Hopper	Inf	900	Buy
Reverse Power Thrust	Inf	200	Buy
Engine Overdrive	1	2000	Buy

[Cancel](#)

Money: 5343068

Buy Weapon

Sector S-2-6

Weapon	Ammo	Price	Buy
Tractor Beam	Inf	700	Buy
Needle Torpedo	20	100	Buy
LBSS Stealth System	1	1200	Buy
Shield Bubble	1	1000	Buy
Energy Cell	2	1000	Buy
Teleport Disc	3	500	Buy
Holographic Disguise	1	2000	Buy
Rapid Shield Recharger	1	600	Buy
LASS Stealth System	1	3400	Buy
Performance Inhibitor Combo Beam	Inf	700	Buy
Inverse Gravity Field Generator	1	1000	Buy
Field Hopper	Inf	900	Buy
Reverse Power Thrust	Inf	200	Buy
Engine Overdrive	1	2000	Buy

[Cancel](#)

Money: 1879073

Utility Equipment for humans and aliens. These were useful items like a couple levels of cloaking devices, some short range teleporter stuff, shield rechargers, tractor beams, forward and reverse thrusters.

Buy Weapon

Sector S-10-4

Weapon	Ammo	Price	Buy
HE Proximity Mine	8	500	Buy
Electro Mine	20	300	Buy
Thunder Bolt Mine	2	2500	Buy
Stealth Mine	5	700	Buy
XHE Time Mine	7	500	Buy
Electro Magnetic Pulse Bomb	10	500	Buy
Gravity Mine	5	1400	Buy
Micro Photon Compression Bomb	1	4000	Buy
Heat Seeking Mine	5	1500	Buy

S-10-4

Cancel

Money: 5337943

Buy Weapon

Sector S-2-6

Weapon	Ammo	Price	Buy
HE Proximity Mine	8	500	Buy
Thunder Bolt Mine	2	2500	Buy
Stealth Mine	5	700	Buy
Plasma Mine	Inf	600	Buy
XHE Time Mine	7	500	Buy
Electro Magnetic Pulse Bomb	10	500	Buy
Gravity Mine	5	1400	Buy
Micro Photon Compression Bomb	1	4000	Buy
Heat Seeking Mine	5	1500	Buy

S-2-6

Cancel

Money: 1873948

The selection of mines for humans and aliens - the thunderbolt/electro mines shoot a beam to nearby ships until they are exhausted, the proximity mines work as you'd expect, stealth mines are represented only with a black outline to make them harder to see. Heat seeking mines move towards nearby ships - gravity mines pull ships in - micro photon bombs are high damage timed explosives suitable for base raiding (drop one onto the defense turret and run). EMP (electromagnetic pulse) weapons disable ships for anywhere from 2-20 seconds based upon proximity or strength of the weapon. This is represented by a loss of control over your ship which just spins around while a timer counts down to you regaining control.

Buy Weapon

Sector S-10-4

Weapon

Electrostatic Field Disruptor
Thunder Bolt
Damage Bubble
EMP Blast
Proximity Blaster

Ammo

<input type="radio"/>	Inf	Info	500	Buy
<input type="radio"/>	1	Info	6100	Buy
<input checked="" type="radio"/>	1	Info	1000	Buy
<input type="radio"/>	Inf	Info	2750	Buy
<input type="radio"/>	3	Info	1000	Buy

Price

500
6100
1000
2750
1000

Money: 5342443

[Cancel](#)

Buy Weapon

Sector S-2-6

Weapon

Electrostatic Field Disruptor
Thunder Bolt
Damage Bubble
EMP Blast
Proximity Blaster

Ammo

<input type="radio"/>	Inf	Info	500	Buy
<input type="radio"/>	1	Info	6100	Buy
<input checked="" type="radio"/>	1	Info	1000	Buy
<input type="radio"/>	Inf	Info	2750	Buy
<input type="radio"/>	3	Info	1000	Buy

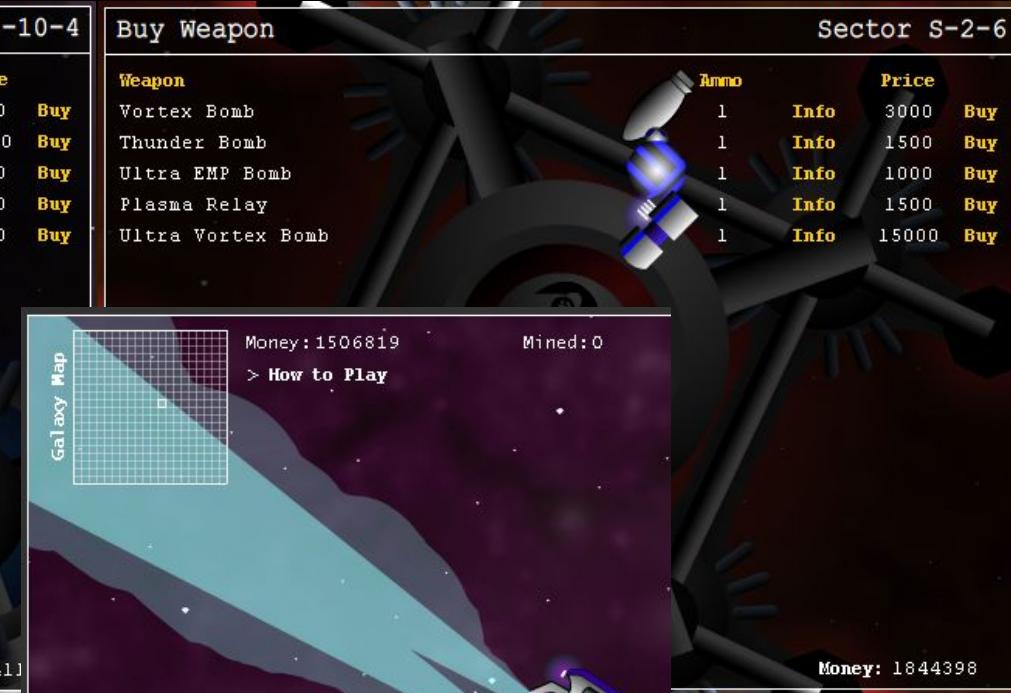
Price

500
6100
1000
2750
1000

Money: 1873323

[Cancel](#)

Proximity weapons are the same between the two races, and produce a bubble around the ship that either has and EMP effect, lightning bolts to nearby ships, straight damage, etc. Cargo-oriented ships usually have the most of these slots.



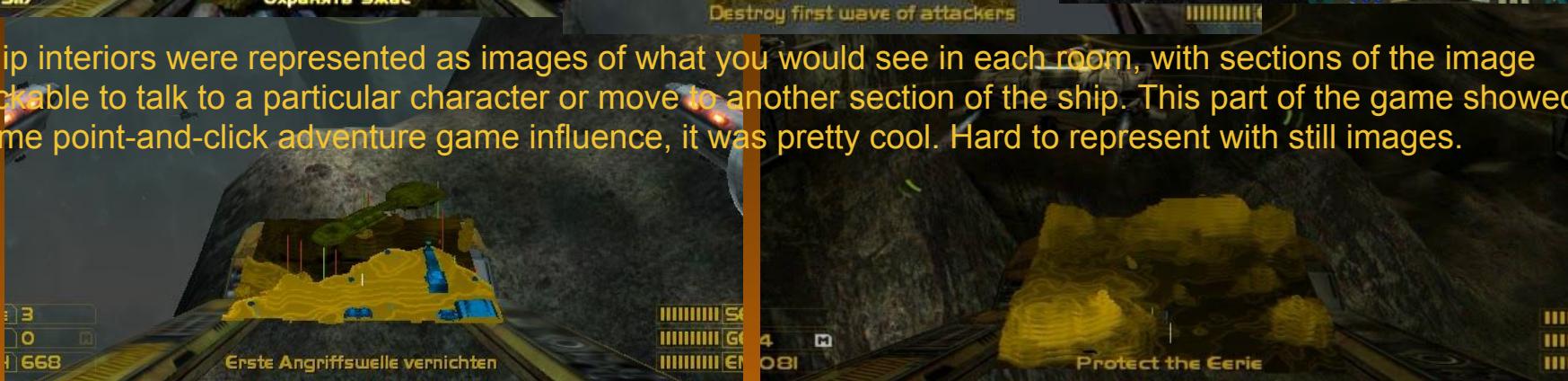
The large weapon dialog - these are purchased as single units of ammo and have to be bought again for each use. Oftentimes, they will be sector-wide effects that hit everyone playing in a multiplayer sector or all NPCs in a single player sector. As an example, the inset image is an alien enforcer using a plasma relay.

Aquanox 2 (2003) - never played this, but I'm very fond of how the minimap is shown, as part of the heads up display on the player's submarine. Basically a limited space sim.





Ship interiors were represented as images of what you would see in each room, with sections of the image clickable to talk to a particular character or move to another section of the ship. This part of the game showed some point-and-click adventure game influence, it was pretty cool. Hard to represent with still images.



Other space sims?

New Block class

functions

- masking(on and off)
- drawing(functions will edit a cell's value iff that cell's mask value is set to true)
- get/set(by index - treated exactly the same as before, as it translates internally to the location in the new 1d array, and also by point - extents are -1,1 on each axis so ideally its a cube, with all extents being equal)
- get dimensions

variables

- integer dimensions
- 1d array of Vox structs (contains: unsigned char state, bool mask, ...)

Notes on states - questions on future developments

Is it desirable to be able to output an image with all colors+alpha?

current output will be grayscale only, limiting visual feedback for editing

a number of basic colors for states? maybe include this in the JSON file, as well?... this is also going to take some time

Palette - needs work

- Should this be contained in the JSON file? Not sure - think more on this.
- The palette is very important in the current scheme - without it, we are looking at grayscale images
- Elements of value within the use of alpha -
 - atmospheric effects (random blues, very transparent)
 - water effects (random blues, less transparent)
 - lighting system (transparent amber color near light, less transparent black colors in darkness - look into minecraft lighting because I know there's some valuable stuff there.)
 - drawing points - distance-based effects? (as in distance from a cell to a point, where a point is part of a point cloud model) I need to think more about this. There's more potential in this idea but it would require some pretty serious restructuring and information/research on material about sampling... perhaps we would have several states for each material, indicating varying levels of influence/presence in that cell - that gets into issues with multiple materials, because then how are they blended, and unsigned char won't be enough to hold that many states. I will need to spend some time and thought on this.