Lessons from SimCity 2000

SimCity 2000 had the Industries window, which showed which industries were in demand nationally, and setting tax rates for them accordingly. These included steel/mining, textiles, petrochemicals, food, construction, automotive, aerospace, finance, media, electronics, and tourism. However, none of them made a big difference in the way industries developed and had mostly an effect on the way industrial demand worked (the way to beat the Flint scenario was basically setting everything to zero except the automotive, which had a discouragingly high tax rate). That was dropped from later titles. But industries define a city's character, whether it be golden age Detroit, Silicon Valley, or any college town you can name.

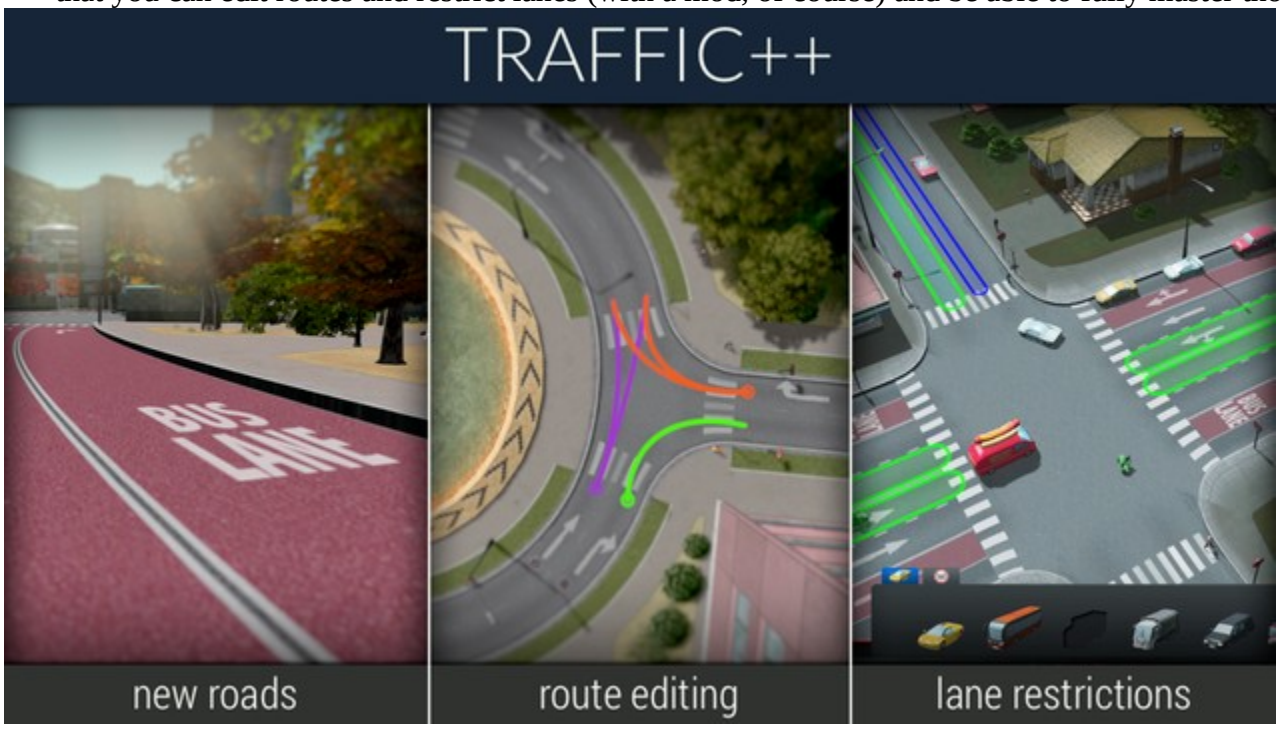
Another broken aspect of SimCity 2000 was the bond system. It was a trap, because it looks like you can issue nearly a dozen of them, yet even issuing one is a massive problem. As Pat Coston says in the ClubOpolis website (still online today: [http://patcoston.com/co/strat4.aspx]). "TWO BONDS!!! Boy are you DEEP in debt". You issue a bond with a set interest rate (which fluctuates depending on the economy of SimNation), and you pay every year until the bond is paid off entirely. Often times you can get another bond with a lower interest rate to pay back the first one, but the situation was bad enough that if most players got in debt to use a bond, they were financially ruined. SimCity 3000 simplified this with a loan system that had a set interest rate which ultimately had them pay back 150% of the total over a decade. It was still a bad idea to get in debt but it was manageable and easily explained enough not to financially ruin players.

SimCity 2000 was excellent because although fairly primitive, it did a good job by using every tile as a function of the city and then crunched a bunch of numbers for the way the zones and special buildings interacted. It was also the last true "Maxis" SimCity ever created before EA bought them and changed focus. SC4 was probably the last vestiges of that ideal, though constrained in some aspects because it was designed to fall in with the way The Sims was going.

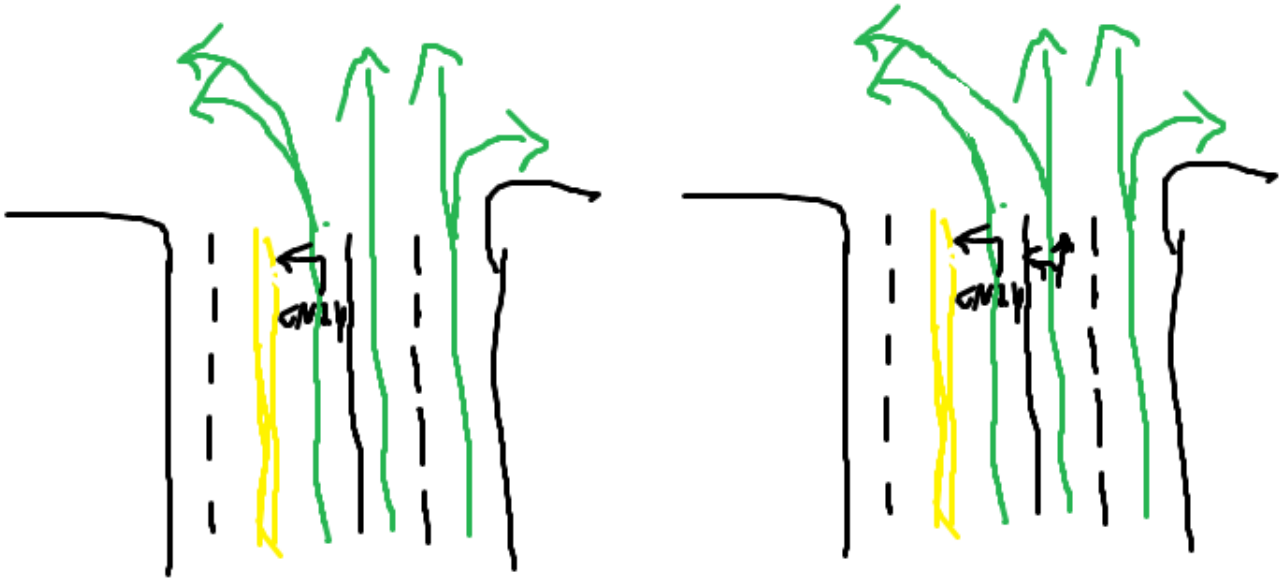
In the KotCity thread, there was talk of a "variable lot system" which in many ways is reminiscient of the "microsims" inside special buildings like arcologies, rewards, schools, and others (basically non-RCI buildings). The numbers that would appear would often be a result of population and funding, with often a random variable or extra calculation thrown in. Querying the fire station has number of firefighters (driven by total population numbers and funding), fire engines (a percentage of firefighters), and the response time (a random number). In SimCity 2000, random numbers in microsims (no effect on simulation) included fire station response time, the wins/losses of the stadium, number of llamas in the zoo, number of pigeons perching on the statue, tons of salt removed from desalinization plants, and basically everything in the Braun Llama Dome.

Cities Skylines and the Intersections

I thought this was part of C:S but it may just be mods. Still, the fact that it CAN be modded easily speaks some volumes to how Cities: Skylines has its good ideas. Despite some of the newer stuff coming out of the NAM recently, SimCity 4 falls tragically short in the way intersections work, only going through set red/green patterns that the player has no way of choosing. Cities: Skylines made it so that you can edit routes and restrict lanes (with a mod, of course) and be able to fully master those



intersections the way you want them to. Need more people to go left? You can by switching left turn lanes around! I drew a picture to show what I'm talking about. Rather than one left lane, there can be two left lanes to better drive traffic.



Unfortunately, as cool as this all sounds, it has one major drawback. The lights can't be controlled, so there's no room to put in a dedicated left turn signal. In older areas or areas where they lack a turn lane, cars simply have to yield if they want to turn left (a modern system in the U.S. introduced less than a decade ago but now wide-spread introduces a yellow blinking arrow). While creating a stoplight system to control exactly when and which lights turn on (2 minutes to go straight, then create a 1 minute light cycle for left turns BUT only if there are cars, etc. etc.) sounds like a dream to those who want total control (the Internet would use the term "autists" but I don't want to abuse that term). The way stoplights work can be infinitely customized (especially if there is a mod to do so) but if it were up to me there would be three options for stoplights: TIMED, SMART, and BLINK. TIMED is the cheap way to operate stoplights, and has two minutes for each light cycle before it switches. (A "Sync" button allows you to change it to work with other lights, but it will cost). This may result in congestion as it may do cycles for sections with no traffic. SMART allows stoplights to adjust for traffic for what's there (this would create less congestion but cost more). I remember when they changed a traffic light on the way home back when I went to a community college. It was a four way stop (essentially) but used a whole light cycle for the exit to a nearly-vacant shopping center. During the daytime, it was horrible as traffic backed up for several blocks, during nights it was just frustrating staying at a light that was turning green for nobody (and the way the intersection was set up, right on red was forbidden). When the traffic light was reset, daytime congestion was cut by almost a third as cars didn't have to wait for a stoplight that nobody was at!

Restricting traffic to certain roads is genius as well. I whipped up this chart (it doesn't include bicycles and only includes cars, trucks, and buses) because buses and trucks can cause slowdown, are more intrusive through quiet roads (or roads that are too narrow) and can cause a lot more damage to the road itself.

Description	Cars	Trucks	Buses
A normal everyday road with no restrictions.	x	x	x
A road with heavy traffic restricted for traffic calming purposes.	x		
A road with heavy traffic restricted for traffic calming purposes.	x		x
A road designated for bus routes.			x
A road designated exclusively for truckers.		x	
A bus route but with deliveries accessible.		x	x
This is impractical but sure, why not?	x	x	
A road closed for construction.			

Any road can be opened for emergency vehicles and there can even be "emergency vehicle" lanes open (sometimes seen in subdivisions or freeway crossovers). Going deeper, you could make cars with multiple occupants behave differently and have HOV lanes, even reversible HOV lanes.

Disasters

This is a bit on disasters I wrote up not too long ago, made mostly from ideas I've over the last few years and inspired by various actual disasters. The Hurricane was inspired by actual hurricanes but also the devastation from Hurricane Harvey, which dumped an enormous amount of rain in Houston. The buckling infrastructure is real--water sat in a depressed freeway for weeks and when it was drained, some of the pavement had buckled and broken, making it unusable until crews were able to replace and patch in new concrete. The riots were from reading about Detroit in the 1960s and how whole blocks burned up because the fire department was not able to reach them. The Industrial Explosion was based after the incident in West, Texas in 2013.

Fires
Triggers: Menu, random event by simulation variables
Nuisance Value: Mild to Catastrophic
Conditions: Like *SimCity 2000*, fires are random occurrences with modified variables, like dry season, their flammability value, and fire coverage.
Countermeasures: Well-funded fire stations can prevent fires from spreading.
Description: The fire has multiple phases that may or may not destroy an entire building. Sending firefighters to the scene can help prevent it from spreading, because it can spread during wind. They spread pretty fast. Most of the disasters either start with fire or start fires.

Flood
Triggers: Menu, random event by simulation variables
Nuisance Value: Mild to Serious
Conditions: Most likely in the wet season
Countermeasures: Detention ponds and dikes usually help.
Description: Water will rise at the lowest elevation, causing abandonment and destruction. How much is random. See hurricane.

Hurricane
Triggers: Random event
Nuisance Value: Mild to Catastrophic
Conditions: High winds and a coastline.
Countermeasures: Same as floods, detention ponds and dikes can mitigate damage.
Description: Hurricanes you WILL get a warning for. Sometimes it's going to be relatively mild and you'll just have high winds and a lot of rain but ultimately not much damage, if you're lucky. A hurricane won't destroy everything in its path like fires will, but they tend to affect infrastructure a lot more. Pipes will break, and highways, roads, and bridges will buckle or be washed out.

Tornado
Triggers: Menu, random event by simulation variables
Nuisance Value: Mild to Moderate
Conditions: Random event by simulation variables, usually on large, flat areas
Countermeasures: Nothing much, just be prepared to rebuild.
Description: A tornado will tear through an area, destroying almost everything in its path. It may also cause fires.

Earthquake
Triggers: Menu, random event

Nuisance Value: Moderate to Catastrophic
Conditions: Random.
Countermeasures: There is an 80% chance you'll be warned ahead of time.
Description: The screen shakes and a number of buildings and infrastructure will collapse. Fires start at random places due to burst gas pipes. There's a 15% chance riots will start afterward but they're fairly mild.

Riots (Civil Unrest)
Triggers: Menu, random event
Nuisance Value: Mild to Serious
Conditions: High heat, high unemployment, high crime.
Countermeasures: Don't let "hot spots" develop.
Description: Riots are bad news and worse than SimCity 2000. You'll be alerted if a protest gets ugly but if the conditions are right, then they'll spawn in other places. Once the action starts, creepy music will start, and they'll set fires to any buildings. You won't be able to save them, as a "no-go" area will be created as long as the riot continues. If the police can push them back enough then you might be able to save buildings. If it gets bad enough, the military will be called in and the rioters will surrender after lethal force is used. However, the affected parts of the city are in ruins. Tanks also cause a lot of road damage. Population will move out, and demand for RCI craters.

Industrial Explosion
Triggers: Fire in progress at plant with a high "explosivity" rate
Nuisance Value: Moderate
Conditions: See Triggers
Countermeasures: Keep industries that can explode away from development.
Description: An incredibly loud noise that decimates the plant on fire and creates a massive shockwave like an earthquake complete with fires. Luckily, there's no riots afterward.

Chemical Spill
Triggers: Random event modified by simulation conditions
Nuisance Value: Mild.
Conditions: Presence of lots of polluting industries.
Countermeasures: The more pollution in the city, the greater chance of one happening but otherwise not much to do. Fire departments can keep the smoke clouds back.
Description: Unlike SimCity 2000, the toxic cloud created by the chemical spill doesn't move around town, and will often hang around in one place unless there's a particularly strong wind. Every tree in the way is destroyed and water polluted. After a while, they'll dissipate on their own. This often involves evacuation, so keep the roads clear. I'm certain that the chemical spill disaster was inspired by an incident in Houston in the 1970s, where a cloud of anhydrous ammonia was created when a truck fell off an overpass and a massive cloud moved through a part of town, destroying vegetation and causing chemical burns to anyone unfortunate to be in its path.

Nuclear Meltdown
Triggers: Random event modified by simulation conditions
Nuisance Value: Serious
Conditions: A poorly-funded nuclear power plant and a roll of the dice.
Countermeasures: Fund your nuclear power plant correctly and it won't happen.
Description: The nuclear power plant catches fire and permanently contaminates the surrounding area with nuclear waste, making it completely useless for anything.

KAIJU!!
Triggers: Menu only.
Nuisance Value: Moderate to Catastrophic
Conditions: Has to be above a certain population and pollution level.
Countermeasures: Unless you want to keep the city small, nothing you can do except fight it off.
Effect: A monster will tear through your city. The military will help out usually.

Train Derailment
Triggers: Random event modified by simulation conditions, tornado
Nuisance Value: Mild (usually)
Conditions: Presence of a railroad in town. The more railroads the higher chance of a disaster.
Countermeasures: Keeping things away from rail can minimize damage.
Effect: The train derailment is an incident where a train can derail, damaging everything near the sides of the tracks, and unlike in SimCity 4 this isn't limited to sharp curves. When a train derails, everything around it is suspect to damage, including bridges and other structures. There's a chance (though not always) that it will have chemicals that require evacuation, and then the Chemical Spill activates. If you're particularly unlucky, it will have the effect of an Industrial Explosion and a massive fire will start.

Terrorism
Triggers: Random.
Nuisance Value: Medium.
Conditions: Must have a very high population.
Countermeasures: A well-funded police department.
Effect: A terrorist will plant a bomb which will go off in a highly-populated area. In addition to the actual damage, it will cause some significant economic issues. However, there's a good chance that your police can catch it and foil the plot.

Drought
Triggers: Random event every 50 or so years
Nuisance Value: Mild
Conditions: Nothing, it's random
Countermeasures: Nothing you can do.
Effect: The drought is a rare non-disaster thing that can happen to your city. Inspired after the 2011 Texas drought, the drought adds a challenge to your city. It's not anything to immediately fight but can cause other disasters to happen. First, it's hot, always hot, and that will give a greater chance of riots to happen. Secondly, the drought will cause people to not hang out at outdoor restaurants and bars, hurting commerce and in effect the economy. Thirdly, trees and plants will die. Fourthly, flammability of EVERYTHING goes way up, so keep that fire station well-funded. Fifthly, your water bill goes up, your citizens will pay for it but so will you.

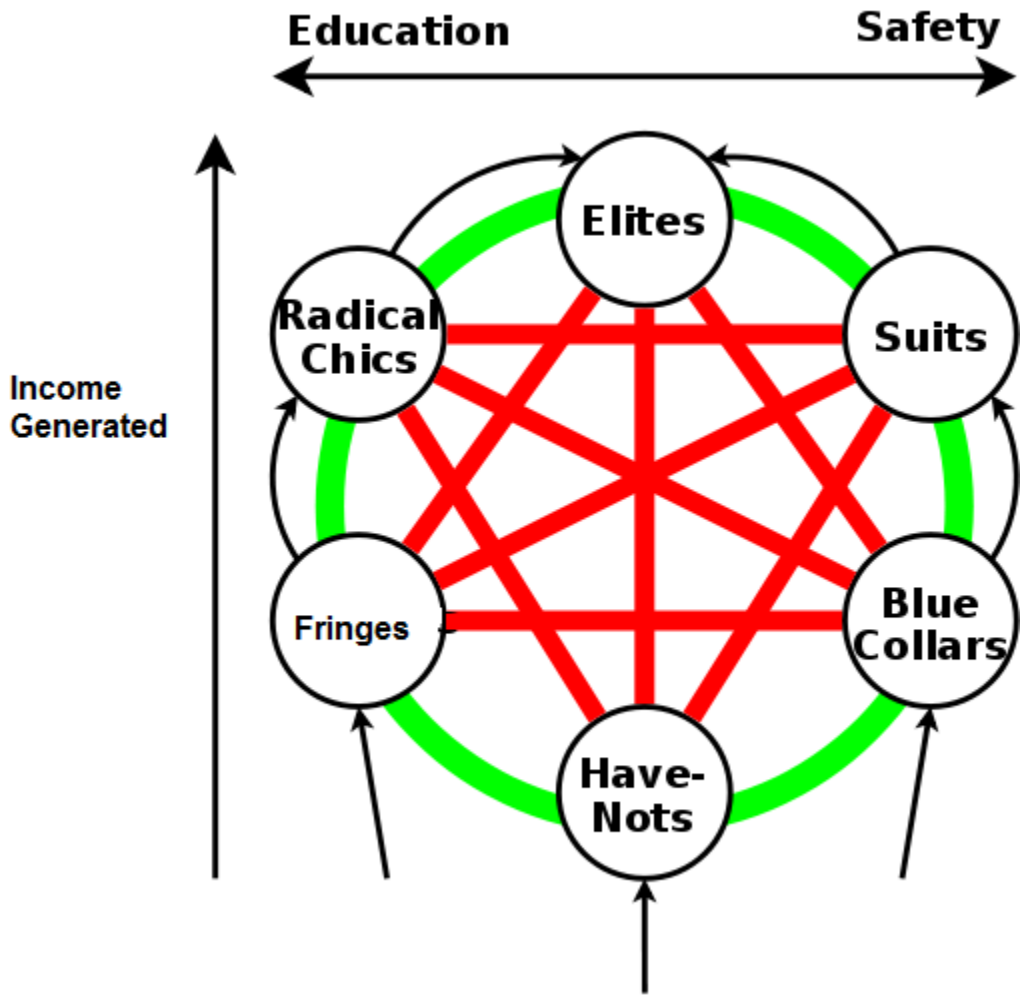
Detectable disasters (earthquakes, hurricanes, tornadoes) will be able to allow the Mayor to select an option to Evacuate the City. At that point, the Cims will head for the doors, whether it be highway or inter-city mass transit. All lanes but one turn contraflow, so the wider the highway the better. Depending on the way your city is built, it may take a while for the city to evacuate. Do it too early (say if it's a false alarm) and your approval rating takes a massive hit. Do it too late (while people are

still on the streets) and your approval rating takes a slight hit. Do it right, and enjoy a better approval rating as well as an extra bonus.

While we're on the subject, SimCity 4 did away with random disasters and put them all in "God Mode". While this prevented the random earthquake to ruin someone's day, it did take away a lot of the challenge of something like a tornado or something coming. Since no city has tornadoes, earthquakes, and hurricanes happening at ANY given chance, one should be able to change those variables before a city starts (kept in a config file). Houston may have hurricanes but not earthquakes (unless the world is ending), while Dallas has earthquakes (very minor) and tornadoes, but never hurricanes. The SimCity 4 disasters ended up being pretty weak, with THREE of them being variations of the monster (UFOs, Autosaurus Wrecks, Robot Attack), Meteor being very minor, and Lightning as pretty much a non-disaster for show.

City Life and the Classes

Monte Cristo's *City Life* was pretty much ignored by everybody and deserved it. However, it did have one interesting feature that dictated the core of the simulation, the six classes. I know I had looked at this and wrote a somewhat revised version along with what transportation options they preferred (for example, some may prefer to do train over car, etc.) but as of this writing, all those notes were left back at my old apartment. It divided the three wealth levels into six classes, all with varying talents in what they did, with blue collars representing the middle class, fringes being the artists, and "radical chics" being the yuppies. (A more detailed relationship can be found with PRIZM demographics, which separates America into some 60 sub-demographics with differing ages, wealth levels, and choice of living)-- [http://pages.srds.com/rs/259-INB-778/images/NielsenPRIZMPremierSegmentNarratives2015.pdf]



Of course, having 60 demographics (in America alone) is hardly manageable in a base simulation, so simplifying it down to six for most cases solves a lot of the inherent problems of the base "three wealth system" that SimCity 4 has. It's sad that SimCity never grew beyond three wealth levels. One of the things in the SimCity 2000 FAQ even mentioned this as a "wish list" item:

52) Country Estates. Historically, rich folk are the ones on the outskirts of the city (the enclaves may get swallowed up, but that's another story). If you build/zone residential stuff really far away from the center of town, maybe we could have a step up from luxury homes and have the estates of the "ultra-rich": huge, sprawling things. Anyone who's ever visited River Oaks in Houston, or Chappaqua in

Westchester County, NY, or Heart Castle in California, will have an idea what I'm talking about. (This is the "filthy rich beyond imagining" type of people.)

A high enough land value neighborhood could even have some sort of crime-lowering effect itself as usually these places have their own police/security force.

Cities Skylines, Theory & Practice

I admit that I didn't play much of Cities: Skylines before I got bored with it and uninstalled it from my (rapidly decreasing in space) hard drive. Part of it was the weird scale it worked with (more on that later), part of it was the fact that it needed mods to do anything useful (the power plant pooping out after only a small section of the city was built was aggravating) and then those mods just grinding away at performance, and part of it was the way traffic worked. Cities: Skylines isn't alone in this but most of my frustration with city sims comes from the fact that they seem to want to force you to use mass transit because of how the simulation is written, so in C:S everybody having a car so even the smallest towns are crammed with traffic. Everyone gets sick (constantly) which requires going to the hospital (ignoring the "rest and fluids" strategy, I guess) and then dies, meaning that hearses constantly crowd the roads getting everyone on the two streets to the cemetery. It was fundamentally broken, and I had none of it.
I certainly won't waste my money on Paradox's DLC, but let's look at what they actually promised. I mean, according to Paradox's official wiki on the game, the base game is supposed to offer an "Extensive local traffic simulation: Fully fleshed out and well-crafted transport systems", and we all know that's a lie.

Leisure specialization: Commercial areas can specialize in leisure activities; working regularly during the day, but especially active during the night.
This sort of ties into an idea I had, where businesses have a set "open/close time" in which they are open for business and employ people (for simplicity sake, let's ignore the times closed and they only have night stockers/maintenance/security). This is of course based after SimTower, where when a business/office closes for the evening, you hear the "bonk"-"bonk" sounds of the cash register closing (for EVERY tenant in the building). For night-time, I can see that bars could be the ones open until 2 am, where they attract people until last call (if you had such a thing, unless you were a city where drinks flowed all day every day).

Tourism specialization: Commercial areas on the shoreline can specialize in beach activities.
Again, it's a cool idea, like how a lot of beach areas offer "surf shops" or whatever (same with rivers or other big tourist activities) but the whole way tourism worked was half-baked at best.

Bikes and dedicated bike lanes and bike ways let citizens opt for a faster alternative to walking.
This is why there needs to be a way for different wealth levels to prefer modes of transportation (like yuppies preferring bicycle)...because of the way the simulation was written, players found buses worked better. Additionally, the bike lanes had sidewalks added to them, making them unrealistic for what a lot of "rail trails" have become in the U.S.

Typically Cities Skylines DLCs are announced every six months, and there has nothing since Green Cities, which felt like a "gimmick" expansion pack rather than adding meaningful content (if Mass Transit and its blimps didn't clue you in).

One more thing that C:S mods did was allow you to change the speed limit for roads, rather than have the speed limit be tied to roads. Kneecapping the roads and avenues to 50 kilometers per hour (30 mph) is realistic I guess (given my experiences here in Houston) but here, everyone exceeds that. Actually keeping 30 mph for in-city roads without congestion is dog slow (this is what I mean about "forcing mass transit", in part).

Double Agent

I passed on SimCity 2013 (not that I had a lot of hope for it, despite it being a surprise announcement back in 2012) but I admit the "agent"-based gameplay was very intriguing, ultimately if it turned out very basic (and simplified), whether by lack of programming ability or just due to time and budget constraints. The idea that every agent could go to "work" and then back home again (even if it wasn't actually the same home, though that gave the simulation a randomized feel) sounded good. Unfortunately, for every good idea it botched two others. So at 8am (or whatever), everyone piled onto the highways, and caused massive congestion. This was later patched to staggered times but first impressions matter, and the whole system was horribly bugged so Sims always sought the shortest route.

Let's say you were on a highway (four lanes, two in each direction) and saw an exit for a small town (one lane in each direction, multiple lights). The in-town speed limit is 30 miles per hour, and the bypass is 65. The main road is only two miles, but the bypass is 2.5. Anyone who isn't interested in going into town would take the bypass, but the SimCity way was for everyone to force their way onto the exit and go through the slow road--after all, it's shorter! When EA announced their own airship DLC, many players ended up buying it just to solve the massive traffic issues the game had.

One of the few actual good features it had was to turn civic buildings "on" and "off", like how many cities end up closing schools just for demographic reasons but still keep them around for storage and maintain the building.

Railroadiana: The Case for a Railroad Expansion Pack

I always liked trains as a kid and having one run straight down through the center of town, largely paralleling a main road made me see lots of them. Heck, that same track still continues to run right near where I work now nearly 200 miles away. Yet, the city sims never seem to get it.

As I mentioned in an earlier post (with the "street-running tracks"), I think there's enough to do with freight railroads that it could constitute a whole "expansion pack". The way railroads were done in SimCity 4 were of course disappointing (to say nothing of the texture), short train passes by, some texture changes in the lights (didn't even LOOK like flashing lights), gates go down and up, didn't even last a few seconds. The avenues didn't even use gates (I think they were wig-wags, which haven't been seen on new-build railroad crossings for decades and have largely been removed from most tracks). No ambient noises, either, which was what SimCity 4 tended to be good at (nothing like the echoing various noises of the city, which is one of SimCity 4's stronger features). Rails are supposed to make a lot of noise, the dinging of the bells before they go down, the rumbling of the tracks, that distinctive whistle, and if you're really close, the screeching of the metal on the tracks. They could provide a challenge, too, like an item you couldn't touch (usually it's the railroad companies that maintain these things and cities can't do anything), so you would have to work with things to cut down on noise (pay to have a quiet zone, but be prepared to close off crossings), or try to work with the traffic problems they create. A modern train in the U.S. can be well over a mile long, and if the train is moving at 35 mph through town, then a train could delay drivers for several minutes. 20 minutes is the legal maximum in America, and 10 minutes is the internal goal for most major lines. But those 10 (or 20) minutes can be disastrous for emergency vehicles.

In SimCity 4, rails are by nature double-tracked, which in the U.S. are usually reserved for busier lines. Where I lived, even though there was one track, there were enough turn-offs and other features that trains could go both directions all day and never have a collision under normal circumstances. Cities: Skylines made SimCity 4's default even worse by making them with the appearance of heavily-trafficked urban corridors without railroad crossings, ruining any sort of semi-rural aesthetics. Neither of them added in true "rail spurs", like a branching off line to parallel with a building (where elevated garage doors would allow boxcars to be loaded) or a parallel line that would allow them to be used with a grain elevator, or any other purpose.

The failure of any city simulator to make decent railroads is something that remains to be seen.

GEMs and the Greater Universe

Mentioned in my list (#60), the GEMs of Cities XL were a flawed concept. Basically, you would buy a mini-DLC that allowed you to build something within a city (a ski resort or a beach, those would be the first two), and then have that ski resort or beach be in your city and your changes would affect it. I was reminded of an interview Will Wright gave in the 1990s how their vision was "building something with one sim and placing it in a bigger world", giving the example of a car, for instance. Some of that was experimented with SC2K (Streets of SimCity, SimCopter) and The Sims, but it never really came to pass. While having a full Sim-theme park inside a modern city simulator is perhaps outside of scope, it might work within the "variable lot system" suggested. At the same time, it would be a distraction to try to build a new theme park ride inside the local amusement park to make it more popular (and the idea that a theme park is built, paid, and maintained with tax dollars doesn't make sense except in Communist Russia). The solution would be (if this was closed source and was on Steam or something) to license certain key components to other developers to make entirely separate applications with cross-compatibility, so it's less pressure on one developer and players can pick and choose what they want.

Scaled Up

Excepting the slightly exaggerated height to look better in isometric view, SimCity 4 was the first to-scale game. Roads are about the width they'd be in real life (with some distortion) and most residential lots fit on 16m*32m lots, which is very true to life in many post-WWII cities in America.

Up near the highway, a Wendy's restaurant sits on a 32m*80m lot. But Houston and California (where SimCity 4 was designed around) have large, generous lots that are really only found in post-WWII America, and there was a lot of talk of how 16m is luxury footage in most everywhere else. C:S fixed that to an extent, where each "tile" was $8m^2$ but did not change the max size a building could develop, resulting in a very off-scale city and off-scale Workshop items. But if we went all the way with "scale" we would have massive sprawling cities, airports that take up what would be a whole "medium" map in SC4 and a quarter of the map in the "large" maps, miles of suburbia to support big skyscrapers, and massive commercial properties. An average Supercenter Walmart would be 16x17 tiles (in SC4 tiles) alone, and even average-sized warehouses would be similar sized. From the view of a player, a 4km*4km city looked huge, but it really wasn't. What there needs to be is two modes of the way scale actually works..."Classic", which would scale cities to how SimCity 4 did them, where you could build a whole skyscraper city surrounded by low density houses all within a 4km*4km grid, and "Realistic" that changes numbers (say, every single family house has 1.5 adults instead of 10) to create a game where you would have to build up your city a whole lot more in order to see the effects of it. But for both purposes, to-scale buildings are a must.