**The Four Main Structures**

***What is a Main Structure?***

The game is managed through four object structures, one to depict the “physical space”, the ground where people could be, another for people depiction called “population”, which is an interface and two literal objects inherit from it, “polis” for people and “citizen” for each individual. The next two main structures are somewhat more complex, because one is for the social activity depiction, including economic and politic movements, and it’s called “activity”. And the remaining is for “production” depiction, and it has every single good and service there are.

***What does the object abstraction work here?***

The objects are used, besides classify elemental objects of the game, they also could depict some of its properties, with a limited scope, and could weave its own system logic. So, consider the possibility of finding systems that escaped the logic of the main parent system, and regard them rather as sub-systems.

From now on, we are going to use the formal and literal names extracted from hard code, so please, note the capital use of words, they could be real code names rather than proper names. so keep in mind that properties, methods, classes and interfaces use “PascalCase” naming convention, if literal object depiction is needed, then deem that these are named using “camelCase”. Just to know, none of the “kebab-case” or “snake\_case” were used.

**Spaces**

**IPhisicalSpace interface**

The interface for the base classes that depict the spaces that are occupy, the world itself. These classes are, from bigger to smaller in scale, Region (with a hexagon shape), Zone (triangle shape), Area (one of the sixth triangle portion shapes), and Parcel (with a square shape). Each one has a property with one or a set of the next “physical space” level of scale, and, of course, the “population” or society that you can control is individually in the smallest portion. Let's describe them one per one sorting them in the inversed order, this is, from smaller to bigger ones, after listing them.

* Parcel
* Area
* Zone
* Region
* Territory
* Continent

**Parcel class**

This is the minimum land unit, where contains products (only the raw one at very beginning) and inhabitants (producing elaborated products just at start), your people begin in the center, this means the Parcel has sixth block that can be used for building the minimum building space, keep that in mind to understand the urbanization.

Now, within each Parcel could have different natural resources (raw products) depending to its “occupancy” and “terrain feature”, basically these are the characteristics that define the kind or type of land it is. In the next section we’ll see these classifications.

**IOccupancy interface**

To define the kind or type of land we must start defining a more abstract classification, which is a practical and about a global classification of the land, these are:

* SweetWater
* Saltwater
* FertileLand
* AridLand
* Woodland
* DenseForest
* Buildings

Each one has its single distribution of the resources, and it’s the first set of distribution, after this set up the process continue to the next stage that will map more the distribution, and closes it to the final configuration.

**ITerrainFeature interface**

Once the Parcel take the Occupancy classification, we must to define several factors that shape the infinite Parcel’s distribution change chain, because they are influence by a set of “features”, or constant factors, that are changed moving the absolute position, so each Parcel will have its single features due to its position in the entire map.

First, the Parcel retrieves from its parent container the set of ITerrainFeature already fixed by them (the Zone in the Parcel case), then the distribution is set up.

**Continent class**

Let's see, we already said the bigger classification is Continent, but the first parameter that it’s required to start the operation will not affect entirely to that land or space level, because is too big. This parameter is the ILatitude (class), once chosen, the continent will be placed depending to the distant from the equator.

**ILatitude interface**

The center of the continent will be exactly your starting position only in the case you choose Tropical as Latitude, therefore your position will be moved from the center of the Continent a 20% to the “pole”, whether you choose Subpolar or Subtropical as Latitude. And if you choose Polar as ILatitude the center of the Continent will be 35% of your starting position. This starting position will be moved later.

Let's listing them (with the available IBiome list after colon, sorted by its weighing):

* **Tropical**: TropicalRainforest, TropicalDryForest, GrassSavanna, SubtropicalRainForest, SubtropicalDryForest, TreeSavanna
* **Subtropical**: XericShrubland, TemperateForest, TemperateSteppe, GrassSavanna, AridDesert, SemiaridDesert, SubtropicalRainForest, SubtropicalDryForest, TreeSavanna
* **Subpolar**: TemperateForest, TemperateSteppe, DrySteppe, XericShrubland, AridDesert, SemiaridDesert
* **Polar**: Taiga, Tundra, TemperateForest, TemperateSteppe, DrySteppe

**IBiome interface**

Then we can get the “wind force” base, the “current force” base, and more ecological or weather features like the available IBiome list (listing them after the colon). This last one is exactly the next necessary parameter that follows. IBiome interface declare the main weather conditions (ITemperature and IHumidity), determine the altitude probability, and modify the previous features.

Here's a list of IBiome classes, from hot arid to cold arid:

* AridDesert
* XericShrubland
* SemiaridDesert
* GrassSavanna
* TreeSavanna
* TropicalRainforest
* TropicalDryForest
* SubtropicalRainForest
* SubtropicalDryForest
* TemperateForest
* TemperateSteppe
* DrySteppe
* Taiga
* Tundra

Each one has a range per property feature, setting boundaries to the rest of climate variables, which could be a lot (scilicet, Precipitation, WindForce, CurrentForce, AtmosphericPressure, Vegetation, ReliefFactor, and Continentality), but the remaining main ones are the set by IAltitude, ITemperature and IHumidity interfaces, where IAltitude is the last one to be set up.

**ITemperature interface**

The next is ITemperature, because with the ILatitude a scaled list of ITemperature values can be set, and then with the IBiome scattered to the game map the ITemperature object properties can be modified, acting like a conditioner feature.

This is a list of ITemperature from hotter to colder:

* Suffocating
* Stifling
* Hot
* Warm
* Templated
* Cool
* Cold
* Chilly
* Frosty

And each one is a temperature range which current value is updated in each game turn, and this modification depend now (within the previous greater boundaries set up) to the time and the counter-influence that the IHumidity could be sent.

**IHumidity interface**

This last feature is set according to several factors. First, and main is the self ITemperature, more precisely the current Grade property, setting the “maximum steam capacity” each game turn, key factor to determine future Precipitation times set up.

IHumidity are classified in the following classes, from the driest to the wettest:

* Barren
* Damp
* Dank
* Dry
* Humid
* Moist
* Parched
* Withered

**ITectonicPlate interface**

Now we can begin to drawing the first “relief” lines, literally, but for that we need the third factor that is needed mandatorily to be chosen, the ITectonicPlate, this will determine the possibilities for the relief forming; regardless of final player position, these ITectonicPlate will be set to stablish a “finite world”, or literally the world.

The option is according to the size basically, and there aren’t many to choose from:

* BigContinentalPlate
* SmallContinentalPlate
* SmallMaritimePlate

Obviously, the most common ITectonicPlate that will be played is BigContinentalPlate, this is composed by giant extensions with or without big water masses, but definitively with a lot of seas and lakes, with river connections. But first comes the IAltitude distribution, especially the higher ones, for this the “finite world” will be set up only with the main ITectonicPlate and their neighborhoods. With this we can set up the direction of the Displacement property, regarding some rules.

**Distribution of the Existing “Finite World” Tectonic Plates**

The probabilities of having neighbors are as follows:

. 100% to have at least one BigMaritimePlate (yes, it exist but you can’t use it), and one BigContinentalPlate as neighbors, but the remaining space is for sale!

. 50% to have only a third remaining neighbor, which, within, a 35% (from total) could be a BigContinentalPlate, and the 15% to BigContinentalPlate.

. 30% to have two more remaining neighbors, 10% to have one BigContinentalPlate and one SmallContinentalPlate, 10% to have one BigMaritimePlate and one SmallContinentalPlate, 8% to have one BigContinentalPlate and one SmallMaritimePlate, and 2% to have one Big ContinentalPlate and one BigMaritimePlate.

. 20% to have three more remaining neighbors, 8% to have 1 BigContinentalPlate, 1 SmallMaritimePlate and 1 SmallContinentalPlate, 6% to have 1 BigContinentalPlate and 2 SmallContinentalPlate, 4% to have 2 BigContinentalPlate and 1 SmallMaritimePlate, and 2% to have 2 SmallContinentalPlate and 1 SmallMaritimePlate.

. 8% to have four more and 2% to five more, in these cases each slot must be drawn from scratch with the following percentages: 35% to BigContinentalPlate, 20% to BigMaritimePlate and SmallContinentalPlate, and 20% to SmallMaritimePlate.

**MovementType property; the Tectonic Plate Direction**

Once set the distribution, to set the ITectonicPlate directions, we have three MovementType properties to construct each one of the boundaries between plates; these are, convergent ones for the plate's collision, divergent ones for plates division, and the transform boundaries for plates lateral displacements. So, the rule leads; first, the northernmost ITectonicPlate, when the chosen ILatitude is Polar, has always divergent movements, otherwise, this “movement direction” has independence of the rest, it depends on its own boundaries/borders. But before dive into this aspect, let’s review what these three “movement types” are.

MovementType property possible values for ITectonicPlate options:

. Convergent: is where the oldest plate suffers a “subduction” displacement below the newest ITectonicPlate in a collision between them, one side will have a “trenched” zone, and the other will have a “mountain range” as result.

. Divergent: is where a “rift valley” zone is generated, in continental boundaries (continental plate against another one like it), or a “sub-maritime mountain range” in maritime boundaries, due to a division in their displacements.

. TrasformBoundary: is where a “faulting” zone is created, whether sub-maritime or not (in any kind of tectonic plate), due to lateral plates displacement.

**The Tectonic Plate Connection Net**

Now, several “magma activity hubs” will be set, not many really, among the wide “finite world” created, exactly in the divergent boundaries, where this “magma hub” would apply a hypothetical force that created that kind of plate movement. This is important to know because on the opposite side convergent movements will be applied, and in the lateral ones a transform boundary will be applied.

So, yes, we could say that divergent movements are the first ones to be set up. Consequently, convergent and transform boundary sides are automatically deducted.

**PlateType; the Tectonic Plate Constitution**

Now we got to use a property to define the entire space kind, this is PlateType property, which values could be:

. Shield for ancient and stable plates.

. Massif for not so ancient and stable plates.

. MountainRange for relatively new and unstable plates.

Shields are set in relatively big areas, massifs are next to mountain ranges, these last ones are found above the boundaries only, but shields also could occupy those zones (although also have high chances to be in the middle of the ITectonicPlate space). But all these calculations must be done further. First, we must deem that in maritime against maritime plates, the boundaries are filled with mountain ranges made of “sub-maritime mountain range”,

Of course, the big line of “mountain ranges” will be the origin to the higher lands, and they will be forming gradually, in a decreasing exponential curve to zones more plains or until to reach the coast (where the altitude becomes negative).

The Continent will be placed in the plate, along with their neighbors, and the plates will fill their ground with the PlateType, MountainRange will be in at least one side of the ITectonicPlate frontier, but if the continental ground isn’t over a transform boundary border, then the ground is a MountainRange PlateType kind, if it is over a transform boundary border, then it a half of the chance to be a Shield PlateType kind, unless a MountainRange comes below, so to speak, forming a long mountain chain.

Shield are mainly set over the center of the continental ground, and Massif depends entirely on the MountainRange. It's clear that for maritime plates it only uses OceanFloor grounds.

Finally, the tectonic plates are set up, then marginal weather factors can be set, like final WindForce adjustments, temperature modifications and consequently the corresponding humidity changes. With these final values, the resources over each land square, set them up in first stages, can be modified by this new atmospheric configuration. This is how the physical spaces are set up without water specifications, in a very rough way.

**Products**

**IProduct interface**

That's what the inner land units are called, every usable unit inside the physic space or land is a product, that it's the result of the natural or artificial production, including their scraps. First, we got the raw products that depends directly to the land type or land combination, second, we got the manufacturing products, and there's several layers in the production chain, and both product kinds are subdivided into sectors that contains categories and possible subcategories that define that kind of job.

The next list is divided by product types, and attached with his own land type, except for the manufacturing products that can only be produced into building areas, so they're attached with inner but distinct processes.

Raw Products:

Maritime

⦁ running water (sweet water)

⦁ hydraulic force (sweet water - saltwater - building)

⦁ fish (saltwater)

Livestock

⦁ beef cattle (fertile land)

⦁ sheep cattle (fertile land)

⦁ pig cattle (fertile land)

⦁ equine cattle (fertile land)

Wild Animals

⦁ wild cervids (fertile land - woodland)

⦁ wild pigs (fertile land - woodland)

⦁ wild bovines (fertile land)

⦁ wild equines (fertile land - woodland)

Agriculture

⦁ grains (fertile land)

⦁ vegetables (fertile land)

⦁ tubercles (fertile land)

⦁ fruits (fertile land - woodland)

Residues

⦁ wastewater (building)

⦁ scraps (building)

⦁ industrial waste (building)

⦁ leftovers (building)

Minerals

⦁ clay (fertile land - arid land)

⦁ decorative rocks (arid land)

⦁ salt (arid land)

⦁ solid rocks (arid land)

⦁ coal (arid land)

⦁ fusel oil (arid land)

⦁ gas (arid land)

⦁ rare minerals (arid land)

⦁ precious minerals (arid land)

Metals

⦁ metalloids (arid land)

⦁ iron (arid land)

⦁ aluminum (arid land)

⦁ copper (arid land)

⦁ precious metals (arid land)

Vegetation

⦁ hard woods (woodland - dense forest)

⦁ soft woods (woodland - dense forest)

⦁ culinary herbs (fertile land - woodland)

⦁ medicinal herbs (fertile land - woodland - dense forest)

⦁ rubber (woodland - dense forest)

Manufacturing Products (all into buildings):

Food

⦁ drinking water

⦁ meats

⦁ salt

⦁ seeds

⦁ vegetables

⦁ alcoholics

⦁ non-alcoholics

Feeding

⦁ storage

⦁ fridging

⦁ ferment

Energy

⦁ coal

⦁ mechanical force

⦁ electricity

⦁ gas

⦁ fuel

Transportation

⦁ heavy transport

⦁ heavy shipping

Vehicles

⦁ boat

⦁ ship

⦁ car

⦁ cart

⦁ plane

⦁ train

⦁ truck

Refinery

⦁ purified

⦁ cast

Wood

⦁ cut wood

⦁ dried wood

Metal

⦁ iron

⦁ steel

⦁ aluminum

⦁ copper

⦁ metalloids

Industrial Elements

⦁ air conditioner

⦁ compressor

⦁ crawler

⦁ electronic devices

⦁ fridge

⦁ furnace

⦁ gears

⦁ gigant tanks

⦁ kiln

⦁ lathe

⦁ rotors

Jewelry

⦁ bulldozer

⦁ crane

⦁ digger

⦁ drill machine

⦁ feller

⦁ lifts

⦁ sewist

⦁ tractors

⦁ welder machine

Jewelry

⦁ precious metals

⦁ precious minerals

⦁ glass

Chemical

⦁ acids

⦁ preservatives

⦁ fertilizers

⦁ material protectors

⦁ drugs

⦁ bactericides

⦁ dye

Constructional

⦁ rocks

⦁ decorative rocks

⦁ concrete

Building

⦁ started

⦁ structural

⦁ builded

Fabrics

⦁ latex

⦁ fabrics

⦁ leathers

Indumentary

⦁ cheap clothes

⦁ expensive clothes

⦁ luxury clothes

⦁ cheap shoes

⦁ expensive shoes

⦁ luxury shoes

Crafts

⦁ ornaments

⦁ crafting

Manufactured

⦁ appliances

⦁ art tools

⦁ construction tools

⦁ crafting tools

⦁ cutlery

⦁ fabrication tools

⦁ furnitures

⦁ textile tools

⦁ weapons

Final Products:

Residues

⦁ leftovers

⦁ sewage water

⦁ scraps

⦁ industrial waste

Medical Cares

⦁ medical attention

⦁ medicaments

⦁ hospitalization

Transportal

⦁ Dealership's

⦁ Fleet

⦁ Squadron

Transport

⦁ business transport

⦁ public transport

⦁ civil transport

Legislation

⦁ precarious

⦁ primitive

⦁ deductive

⦁ utilitarian

⦁ excessive

Commerce

⦁ appliance's

⦁ bazaar's

⦁ books

⦁ cleaning's

⦁ furniture's

⦁ hardware's

⦁ jewelry's

⦁ real estate

Policies

⦁ policy

⦁ politics

Financial Instruments

⦁ stocks

⦁ assets

⦁ tokens

⦁ derivatives

Religiosity

⦁ assortment

⦁ religiosity

Security

⦁ scattered

⦁ nucleated

⦁ presented

⦁ controlling

Knowledge

⦁ basis

⦁ elaborated knowledge

⦁ sophisticated knowledge

Educational

⦁ primitive

⦁ laborious

⦁ proffesional

⦁ thorough

Cultural

⦁ folk

⦁ popular

⦁ elaborated

⦁ vanguardist

Services

⦁ traffic

⦁ private cleaning

⦁ public cleaning

⦁ clerkship

⦁ assistance

Gastronomic

⦁ eatery

⦁ beverage

Armies

⦁ infantery

⦁ cavarly

⦁ navy

⦁ artillery

⦁ air force

**Population**

**IPopulation interface**

The inhabitant units have psicological parameters, that impacts over the economical ones, so this is a demographical and sociological feature that increase significantly the complexity even in the initial version. Into the demographical features we got the status and the niche properties, and in the economical features we got the class among others.

The next list is divided by population features, and his classification.

Demographical Features:

Status

⦁ richs

⦁ wealthies

⦁ professionals

⦁ poors

⦁ pauper

Niche (at least one per sector)

⦁ culinaries (feeding)

⦁ bartenders (beverage)

⦁ miners (extraction)

⦁ lumbermen (extraction)

⦁ builders (infrastructure)

⦁ industrials (manufacture - energy)

⦁ textiles (manufacture)

⦁ carpenters (manufacture)

⦁ smiths (manufacture)

⦁ chemists (manufacture)

⦁ chauffeur (transportation)

⦁ holders (finance)

⦁ merchants (finance)

⦁ traders (finance)

⦁ politics (politic)

⦁ doctors (healthcare)

⦁ pharmacists (healthcare)

⦁ guards (security)

⦁ police (security)

⦁ agents (security)

⦁ artists (culture)

⦁ lawyers (justice)

⦁ judges (justice)

⦁ researchers (cience)

⦁ theorists (cience)

⦁ teachers (education)

⦁ soldiers (militia)

⦁ marines (militia - trasportation)

⦁ pilots (militia - trasportation)

⦁ cleaning staff (services)

⦁ clerks (services)

⦁ assistants (services)

Sociological Features:

Class

⦁ owners

⦁ investors

⦁ employees

**Social Activity**

**IActivity interface**

**Sectors and Categories**

This is the way to characterizing the manufactured products and subdivide the economic dinamicaly. Here I'll describe the full economical circuit system of the game. The categories can be subdivided at the same time by subcategories, but it's taken for granted the ranks within each one, this means that the level of responsability is deduced inside the class and status characteristics, and also the blending between sectors and products includes much more of the productive chain than it suggests, this is the commercial part among other nuances.

The following sectors are bound to the products backwards, even more related with the categories. These, surely, cover the entire production chain.

Feeding

⦁ meats

⦁ starchs

⦁ greens

⦁ sweets

Beverage

⦁ water

⦁ alcoholics

⦁ no-alcoholics

Extraction

⦁ construction minning

⦁ felling

⦁ energy minning

⦁ other minnings

Infrastructure

⦁ little constructions

⦁ middle constructions

⦁ big constructions

⦁ monumental constructions

Manufacture

⦁ industry

⦁ textile

⦁ carpentry

⦁ blacksmith

⦁ chemical

Energy

⦁ traction

⦁ hydraulic

⦁ electric

⦁ fosil

Transportation

⦁ blood

⦁ steam

⦁ fosil

Finance

⦁ assets

⦁ stocks

⦁ tokens (vouchers/bonds)

⦁ derivatives

Politic

⦁ rightists

⦁ centrists

⦁ leftists

⦁ thirds

⦁ fourths

Healthcare

⦁ medical care

⦁ medication

⦁ sanitation

⦁ health

⦁ surgery

Security

⦁ patrol (vigilance)

⦁ surveillance

⦁ special force

⦁ intelligence

Culture

⦁ high

⦁ mid

⦁ low

Justice

⦁ civil

⦁ commercial

⦁ labor

⦁ criminal

Cience

⦁ basic

⦁ intermediate

⦁ advance

⦁ sophisticated

Education

⦁ primary

⦁ secondary

⦁ academic

Militia

⦁ army (infantry + cavarly)

⦁ navy

⦁ air force

⦁ intelligence

Services

⦁ cleaning

⦁ clerkship

⦁ assistance