Each defined by an *extendable* set of VARIABLES:

- **RESOURCES** e.g. water, workforce
- **CONDITIONS** e.g. health, temperature, population, fire awareness
- **INFRASTRUCTURE** e.g. hospitals, farms
- **UNITS** e.g. armed forces
- **TECHNOLOGY** e.g. drought resistant crop
- **TERRAIN** e.g. desert, forest, cleared land
AND

MODULES which interact with these variables by

- using, consuming or producing RESOURCES
- depending on or affecting CONDITIONS
- using, building or destroying INFRASTRUCTURE
- using, creating or eliminating UNITS
- using or developing TECHNOLOGY
- depending on or affecting TERRAIN
FARMING MODULE

USES WATER and FARMLAND

PRODUCES FOOD

Actual amount produced depends on
- the temperature
- the amount of water allocated and used
- the amount of cleared land allocated and farmed
- the technology available
e.g. drought-resistant crop
Ideas relating to the “drought resistant crop” technology...

1. In order to have this technology the city must use government funding to develop it, or purchase it from another city.

2. The city could trade this technology (direct city-city interaction) ---› it may be taken up by a city who was previously importing food from another source (ripple effect causing extended city-city interaction)

3. The city could export the food produced (direct city-city interaction) ---› it may be imported by a city that was previously importing food from another source (again ripple effect causing extended city-city interaction)

4. The city could have instead / in addition to acquiring new technology, imported food from another place, so that a decrease in food production doesn't have such a big impact (choices) ---› long term game play may reveal this as a less/more sustainable solution.
FIRE MODULE

TEMPERATURE increases probability of fire event

FIRE EVENT
Destroys buildings (infrastructure), and forests (terrain); reduces health and population (conditions); absorbs CFA units.

IMPACT depends on
- building's level of “fire-proofing”
- size of CFA units
- amount of community education re. fire awareness
Reduce the complexity of construction to individual modules.

Experience the emergent complexity of multiple modules.
Modules will take turns to interact with the environment.

How to make it appear all the modules are operating concurrently in the one common environment?
1. Modules take turns for operation and suspend when a resource is requested

2. When all requests are taken, resources will be allocated

3. Allocation can be customised to be fair, biased or competitive e.g. water vs. government funding

4. Modules will resume, with their newly allocated resource(s).
HOW LONG IS A “TURN”? 

User turn will be constant.

Support modules with varying time scales.

e.g. a module may operate weekly for a period of months, hourly for one day...
The User

Has “control” over a country through the following decisions

- What infrastructure to build
- How to control resource allocation
- If and when to trade with another city
- Where to situate units
- Setting module variables
- ...

...
DEMONSTRATION MODULES

FLOOD MODULE

- Randomly produces flood events of some size

FLOOD PROTECTION MODULE:

- Eliminates the impact of a flood event:
  
  IF a flood event occurs, and there is a flood wall, there is no impact on the city
  
  ELSE health is reduced and water levels increase
DEMONSTRATION MODULES

ANITIVIRAL MODULE

• Produces X antivirals per turn

SWINE FLU ABM MODULE

• Uses advanced ABM developed by Miles Parker to simulate the spread of Swine Flu.

• Extended with the rule:

  IF a person is infected and no hospital exists
  OR a hospital exists but there are no antivirals available,
  then health is reduced

ELSE an antiviral is consumed and the person recovers