**MORE FORMAL WORDS:**

The main game loop will include a **Singleton** instance for **City Hall** and possibly the **City Map** (since only one instance of each is allowed). Alternatively, the **City Map** could contain a pre-placed Singleton of **City Hall**.

The **City Hall** will track overall game state, such as **total satisfaction**, **coin balance**, and **materials**. Note that resources like materials may later be managed by warehouses for distributed storage.

When a user places a **City Structure**, the game must validate placement. For instance, a building must connect to a road, and roads cannot be isolated. Each placed structure affects the satisfaction of surrounding structures, coordinated via the **Mediator pattern**.

**Placement Effects**:

* **Placing a Road**: Affects nearby residential complexes only, as they must recalculate traffic satisfaction. If the new road has lower traffic than surrounding roads, it will reduce average traffic, improving satisfaction in nearby complexes.
* **Placing a Residential Complex**: Affects nearby roads only, not other residential buildings directly. However, adding more residential buildings increases traffic on shared roads, which decreases satisfaction for nearby complexes. Placing a residential complex thus informs the road to update its traffic, which then informs nearby buildings to adjust their satisfaction.
* **Placing a Commercial Building**: Affects both **traffic satisfaction** and **employment satisfaction**. Similar to residential complexes, it impacts traffic satisfaction, but it also increases employment within its influence radius.
* **Placing an Industrial Building**: Affects both **traffic satisfaction** and utility satisfaction (e.g., power, water). Industrial buildings impact traffic similarly to residential complexes and may increase utility satisfaction within their radius if they include specialized plants (via decorators). NOTE: Not all industrial buildings are supposed to affect things only the plants with their decorators
* **Placing a Landmark**: Influences both **traffic satisfaction** and **bonus satisfaction**. Like residential complexes, it affects traffic satisfaction, while adding extra satisfaction bonuses within its influence radius.
* **Placing Facilities**: Not yet implemented but intended to function similarly to the other structures above.
* **Placing Transportation Hubs (Railway Stations, Airports)**: Adds a capped bonus (up to 15) for traffic satisfaction

The game loop will also handle **population dynamics** with functions like **immigrate** and **emigrate** (birth and death). Population increases beyond the city’s housing capacity could lead to homelessness if implemented.

Finally, the main game loop will leverage the **Chain of Responsibility pattern** to manage migration rates based on varying city satisfaction levels. While migrations will be somewhat randomized, a happier city will attract more people.

**MY OWN WORDS**

The game loop will have a singleton for the city hall and maybe a city map (since your only allowed one) (OR maybe the City Map has a a pre placed singleton of City Hall or something)

The City hall will keep track of overall game state for example total satisfaction, how many coins you have, the materials you have (we were however planning on moving the resources to warehouses that store them instead)

The user can then place a City Structure. For each city structure we must do validation for example you cant place a building without it being connected to a road or you cant place an isolated road.

When the user places a a structure, it affects the satisfaction of surrounding structures (see mediator)

Place a road: Only affects residential complexes. The surrounding residential complexes must recalculate their traffic satisfaction as this new road could bring the average traffic around the residential complex up or down (for example if you place new road and that road has a low traffic and every other surrounding road has high traffic, this new road brings the average traffic down and make people happier)

Place a residential complex: ONLY affects the surrounding roads. Placing a residential building wont make another residential complex happier or sadder directly. It will however make them sadder if the new residential complex added shares a road since it will increase that roads traffic. Sop when you place a residential complex it informs the road to change its traffic which informs the surrounding buildings to change their satisfaction

Place a commercial building: Affects BOTH traffic satisfaction and employment satisfaction. A new building will affect traffic the same way as a residential complex but it will also increase the employment with its radius

Place Industrial Building: Affects BOTH traffic satisfaction and Power, Water etc satisfaction. . A new building will affect traffic the same way as a residential complex but it will also increase the power, water and things with its radius. NOTE: Not all industrial buildings are supposed to affect things only the plants with their decorators

Place Landmark: Affects BOTH traffic satisfaction and Bonus satisfaction. A new building will affect traffic the same way as a residential complex but it will also increase the extra bonus from landmarks with its radius

Place Facilities: Not implemented (Which we probably should do) but same functionality as above

Railway stations and Airports are currently only an added bonus, they add an extra boost to traffic satisfaction capped at 15

The main game loop will then have functions like immigrate and emigrate (born and die) etc that will increase the total population and which (if we choose to do it) exceed the capacity of the city and cause homelessness.

The main game loop will use the chain of responsibility and based on different satisfaction levels of the city, it will have a different rate of migrations (It will be randomized but obviously a happy city will bring in more people)