

# GMT 458 - Web GIS Assignment: City Hunter GeoGame Design Report

Project/GameName: City Hunter: Turkey Edition

Project Goals: Using Web GIS technologies (OpenLayers), we create a simple and fun time-limited guessing game that improves understanding of geospatial information and interaction on the map.

## 1. Game Mechanics and Gameplay

### 1.1. General Concept

The game asks the user to guess the center of a randomly selected hidden Turkish city from among city centers marked on a map, based on the distance (in kilometers) between two points. The game is played with a 30-second time limit.

### 1.2. Game Flow (Cycle)

Aşama	Adımlar	Açıklama
The Start	Explanation Screen	Displays the rules of the game and the "Start" button on the left panel.
Game Start	Timer and Secret City Selection	When you press the "Start" button, the timer (30 seconds) begins. A random target city is selected.
Prediction Phase	User's Prediction	The user clicks on one of the city centers marked on the map.
Feedback	Distance Calculation	The distance in kilometers (km) between the clicked city center and the hidden target city center is calculated and displayed in the left panel.
Visual Cue	Prediction Markup	The marker (Feature) that the user clicks turns yellow to indicate that the prediction has been made.
Win Condition	Correct Guess	The user wins the game when they click on the same city center as the hidden target city (distance \$= 0\text{ km}\$. The timer stops.
Lose Conditionfound.	Time Out	The game is lost when the 30-second timer runs out and the correct city is not found.
End of Game	Return	End of Game Return The user is informed of the result and returns to the starting screen with the "Play Again" button.

## 2.Design Structure and User Interface (UI)

### 2.1. General Layout

The game will be divided vertically into two main sections using CSS Flexbox:

Section	Percentages	Content	Style
Control Panel (Left)	30%	Game Instructions, Timer, Secret City Hint Text, KM Result and Buttons.	Dark (black or navy blue) background, light (white/green) text.
Map Panel (Right)	%70	Completely OpenLayers map.	The map view is always focused on Türkiye, with all city centers marked.

## 2.2. Data to Use

The game will use manually defined fixed geographic coordinates of major urban centers in Türkiye.

### Sample Data Structure (JavaScript Array):[

```
{
  name: "Ankara", coords: [32.8597, 39.9334] }, // [Longitude, Latitude]
  {
    name: "İstanbul", coords: [28.9784, 41.0082] },
  // ... other citys ...
}
```

## 2.3. Visual Feedback and Animation (CSS Requirement)

### - Mileage Indicator:

The calculated distance will be displayed to the player in a prominent size. As the distance decreases, its color will change from red to yellow/green (via CSS transition and class change).

### - Markers:

All cities: Blue dot/icon.

User's Guess: Yellow dot.

Secret Target (End of Game): Red dot.

### - Timer:

As time decreases, the color of the timer text will change to red, increasing the feeling of pressure.

## 3. Technologies and Methods to be Used

### 3.1. Libraries

Library	Purpose of Use
HTML5, CSS3, JavaScript	Basic structure, style and game logic.
OpenLayers (ol)	Displaying a map, adding clickable markers (Features) to the map, and capturing map events (clicks).

### **3.2. Basic Algorithms (GIS Application)**

- **Coordinate Transformation:** Using OpenLayers' built-in functions (`ol.proj.fromLonLat`), geographic (WGS84: Latitude/Longitude) coordinates will be converted to screen coordinates.
- **Distance Calculation (Haversine Formula):** Used to calculate the curvilinear distance (in km) between two geographic points. This formula forms the core GIS component of GeoGame.

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