 **GIS EXERCISES**

**Exercise 2: Buffer Analysis**

**Objective:** Create buffer zones around hospitals to identify areas within walking distance from medical facilities.

**Example Scenario:** In a city planning project, you need to assess the accessibility of hospital services for suburban residents. By creating buffer zones around hospital locations, you can identify which suburban areas are within walking distance of hospitals and which areas may require additional healthcare facilities to improve accessibility.

**Steps:**

**Load Shapefiles:**

Open ArcGIS and load the following shapefiles into your map project:

Hospitals

Suburbs (optional, for context)

**Set Map Projection:**

Ensure that your map project is using an appropriate projection system (e.g., a local projection system in meters for accurate distance measurements).

**Create Buffer Zones:**

Select the Hospitals layer.

Use the "Buffer" tool to create buffer zones around hospital locations. Set the buffer distance to 500 meters (or any other suitable distance).

Ensure that the buffer operation is set to "Full" so that buffer zones are created around the entire perimeter of hospital points.

**Analyse Buffer Zones:**

Examine the buffer zones created around hospitals. These zones represent areas within walking distance (500 meters) from each hospital.

**Overlay with Suburbs (Optional):**

If you have a suburbs layer loaded, overlay the buffer zones with suburban areas to identify which suburbs fall within walking distance of hospitals.

**Interpret Results:**

Analyse the spatial distribution of buffer zones to assess the coverage of hospital services within the study area.

Identify areas that may have limited access to hospitals within walking distance and areas that are well-served by hospital facilities.

**Generate Reports:**

Document your findings, including the percentage of suburban areas covered by hospital buffer zones and any areas with limited access to hospitals.

**Skills Learned:**

Application of buffer analysis for proximity assessment.

Understanding of spatial accessibility to essential services.

Interpretation of spatial analysis results for urban planning and public health applications.

***Note:*** *Encourage students to consider variations in buffer distance (e.g., 200 meters, 1 kilometer) and how these variations impact the analysis results. Discuss the importance of buffer analysis in urban planning, public health, and emergency management contexts.*