Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
Hingna Road, Wanadongri, Nagpur - 441 110
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Department of Computer Technology

Vision of the Department

To be a well-known centre for pursuing computer education through innovative pedagogy, value-based education and industry collaboration.

Mission of the Department

To establish learning ambience for ushering in computer engineering professionals in core and multidisciplinary area by developing Problem-solving skills through emerging technologies.

Session 2025-2026

Vision: Dream of where you want.	**Mission:** Means to achieve Vision

Program Educational Objectives of the program (PEO): (broad statements that describe the professional and career accomplishments)

PEO1	**Preparation**	**P: Preparation**	**Pep-CL abbreviation pronounce as Pep-si-lL easy to recall**
PEO2	**Core Competence**	**E: Environment (Learning Environment)**	
PEO3	**Breadth**	**P: Professionalism**	
PEO4	**Professionalism**	**C: Core Competence**	
PEO5	**Learning Environment**	**L: Breadth (Learning in diverse areas)**	

Program Outcomes (PO): (statements that describe what a student should be able to do and know by the end of a program)

Keywords of POs:

Engineering knowledge, Problem analysis, Design/development of solutions, Conduct Investigations of Complex Problems, Engineering Tool Usage, The Engineer and The World, Ethics, Individual and Collaborative Team work, Communication, Project Management and Finance, Life-Long Learning

PSO Keywords: Cutting edge technologies, Research

"I am an engineer, and I know how to apply engineering knowledge to investigate, analyse and design solutions to complex problems using tools for entire world following all ethics in a collaborative way with proper management skills throughout my life." *to contribute to the development of cutting-edge technologies and Research*.

Integrity: I will adhere to the Laboratory Code of Conduct and ethics in its entirety.

Name and Signature of Student and Date
(Signature and Date in Handwritten)

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Session	2025-26 (ODD)	Course Name	PE-I - Geo-Intelligence for Smart IoT Devices Lab
Semester	5	Course Code	23IOT1523
Roll No	36	Name of Student	Darshil D. Amalkar

Practical Number	**03**
Course Outcome	Apply and demonstrate the use of proprietary and open-source GIS tools (e.g., QGIS) for creating, visualizing, and managing spatial datasets.
Aim	Create a GeoPackage or shapefiles and digitize point/line/polygon features on QGIS interface.
Problem Definition	The task requires creating a GeoPackage or shapefile in QGIS and digitizing point, line, and polygon features using the software's editing tools.

Theory (100 words)	**Creating Your First Digital Map Layers**
	Ready to move beyond using existing maps and start creating your own? The process of drawing your own features onto a map is called **digitizing**. It's like having a blank canvas where you can add points, draw lines, and create areas. Here's how to set up your digital layers in QGIS.
	
	Option 1: Create a GeoPackage Layer (The Modern Approach)
	Think of a **GeoPackage** as a neat, tidy database in a single file. It's the modern and recommended way to store your map data because it keeps everything organized in one place (.gpkg).
	Setting Up Your Canvas
	1. To get started, navigate through the main menu: **Layer → Create Layer → New GeoPackage Layer**.
	2. A dialog box will appear, asking for some details:
	  o **Database:** First, tell QGIS where to save your main GeoPackage file. Click the browse button, choose a folder, and give it a name (e.g., My_Project.gpkg).
	  o **Table name:** Now, name the specific layer you are about to create. Keep it simple and descriptive, like Parks, Roads, or Schools.
	  o **Geometry type:** This is where you choose your drawing tool. Select **Point** for single locations, **LineString** for paths and networks, or **Polygon** for areas.
	  o **CRS:** Every map needs a coordinate system. A great default for global data is **EPSG:4326 - WGS 84**.

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	o **Attribute Fields:** Here you can design the spreadsheet that will accompany your drawing. Add columns (fields) to store information, such as a name field (for text) or a population field (for a whole number). 3. Click **OK**, and your new, empty layer will appear in the Layers panel, ready for you to add data. **Adding Your Features** Now for the fun part—drawing! 1. Right-click on your new layer and select **Toggle Editing**. This "unlocks" the layer and activates the drawing tools. 2. Find and click the **Add Feature** tool on the toolbar (it will look like a point, line, or polygon). 3. Click on the map canvas to draw your feature. When you're done, a form will pop up, prompting you to fill in the attribute information for the shape you just created. 4. When you're finished drawing, be sure to **save your edits** and then toggle the editing mode off. **Option 2: Create a Shapefile Layer (The Classic Format)** A **Shapefile** is a classic and widely used format. Its main difference is that it's actually a collection of several files (.shp, .dbf, .shx, etc.) that must always be kept together in the same folder. The creation process is nearly identical: 1. Go to **Layer → Create Layer → New Shapefile Layer**. 2. In the dialog, you'll set the **File name**, choose a **Geometry type**, and define the **CRS**, just like with the GeoPackage. 3. Digitizing features works the exact same way: **Toggle Editing**, use the **Add Feature** tool to draw, and **Save your edits**.
Procedure and Execution (100 Words)	Implementation Steps: Step 1: Prepare Your Digital Canvas First, we need to set up a new layer to draw on. It's like choosing a fresh sheet of paper. 1. Open QGIS. You'll be greeted by a blank project. 2. In the top menu, navigate to Layer → Create Layer. 3. We'll choose New GeoPackage Layer. This is the modern, recommended option because it stores all your map data and information neatly in a single .gpkg file. 4. A dialog box will pop up. This is where you define your new layer:

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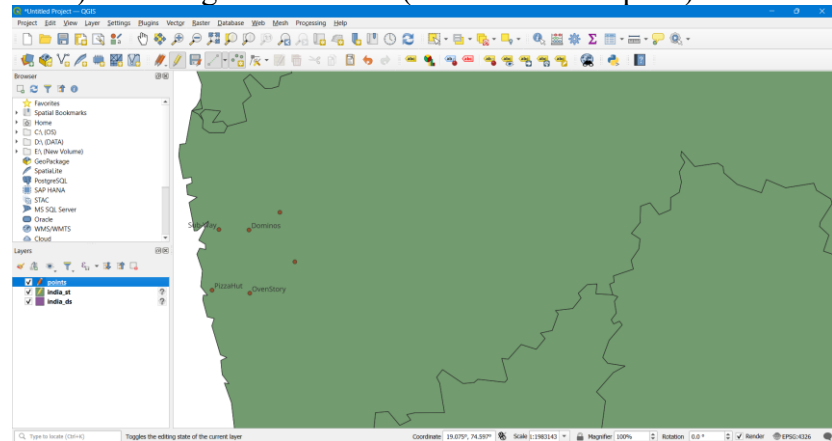
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- o Name your layer: Give it a clear, simple name that describes what you'll be drawing (e.g., Buildings, Rivers, or Survey Points).
- o Choose your 'pen tip' (Geometry type):
    - Point: For marking single spots (e.g., trees, bus stops).
    - Line: For drawing paths or networks (e.g., roads, rivers).
    - Polygon: For outlining areas (e.g., parks, lakes, city blocks).
- o Set the Coordinate System (CRS): This is your map's "language." A safe, universal choice is WGS84 (EPSG:4326).
- o (Optional) Add Information Fields: You can add columns like "Name" or "Type" to store text and data about each feature you draw.

5. Click OK. Your new, empty layer will now appear in the Layers panel, ready for your masterpiece.

Step 2: Start Sketching Your Features

Now for the fun part—drawing on the map!

1. To begin, you must enter "Editing Mode." Right-click on your layer in the Layers panel and select Toggle Editing. A small pencil icon will appear next to the layer name.
2. Next, find and select the Add Feature tool from the toolbar. The icon will match the geometry type you chose.
3. Start drawing on the map canvas:
    - o For Points: Simply click once where you want to place your feature.
    - o For Lines: Click to place the starting point, then continue clicking to create vertices (corners). When you're done, just right-click to finish the line.
    - o For Polygons: Click around the perimeter of the area you want to outline. To complete the shape, right-click anywhere, and it will automatically close.
4. After you finish drawing each feature, a form will pop up, asking you to fill in the information you set up earlier (like its name). Fill it in and click OK.

Step 3: Save Your Work

This is the most important step! To make your changes permanent, you must save them.

1. On the toolbar, click the Save Edits button (it looks like a floppy disk).

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2. Once saved, right-click your layer again and select Toggle Editing to turn off editing mode. This locks in your work.

A complete map is often a collection of different layers working together. If you need to map different types of features, just repeat the process and create a new layer for each one! For example:
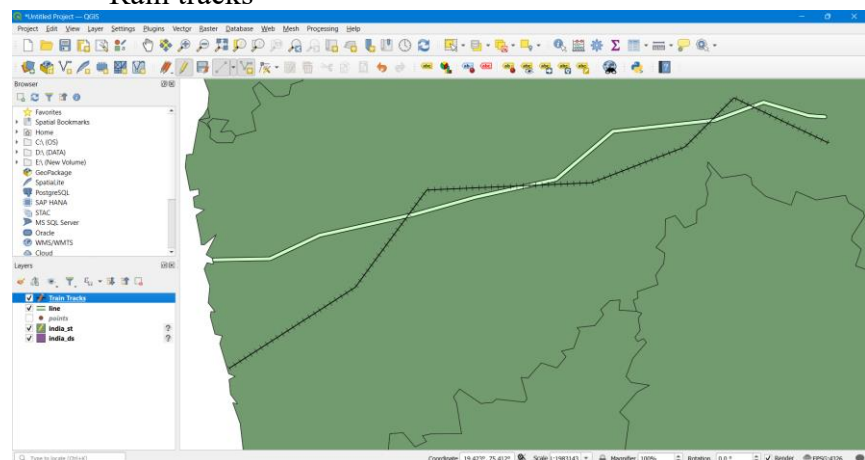
- schools.gpkg (Points)
- roads.gpkg (Lines)
- parks.gpkg (Polygons)

Stepwise Screenshots with steps:

1) showing the Point data(of Food Chain Spots):-

2) Showing the Line data by denoting the Expressway and Rain tracks

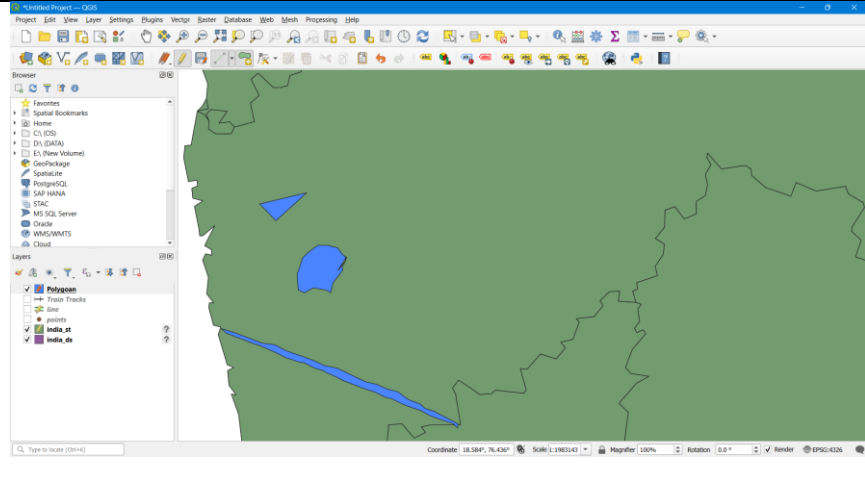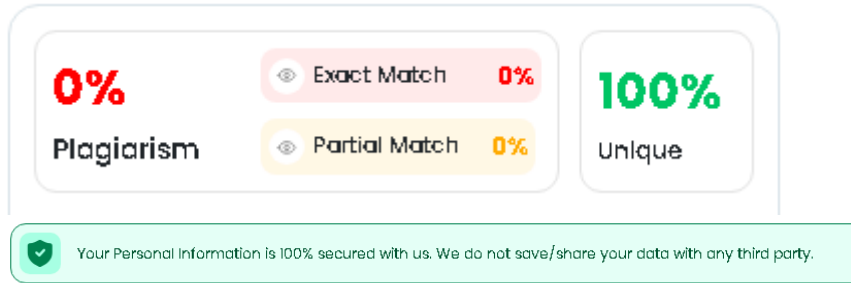
3) Using the Third Data Polygoan we denoting the water bodys

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Output Analysis	After you've finished digitizing, it's crucial to perform a quick output analysis to check your work. The best approach is to add a satellite or street map basemap beneath your new layer to visually compare your features. Pan and zoom around the map to confirm that the points, lines, and polygons you drew are in the correct real-world locations and that their shapes are accurate. Finally, open the layer's attribute table to proofread the information you entered, catching any typos or missing details.
Link of student Github profile where lab assignment has been uploaded	**https://github.com/Darshil-yup/GIS_Lab**
Conclusion	By following this workflow, you've learned the essential skill of **digitizing**, successfully transforming a blank canvas into a valuable, **custom dataset**. This foundational ability is powerful, as it allows you to create the precise data you need for any project. Your new, verified layer is now ready for the creative steps ahead, whether that involves styling its appearance, using it in a spatial analysis, or sharing it in a final, polished map. You're no longer just a map user—you're a map creator
Plag Report (Similarity index < 12%)	
Date	**12-08-2025**