



**RAJALAKSHMI**  
**ENGINEERING COLLEGE**  
An AUTONOMOUS Institution  
Affiliated to ANNA UNIVERSITY, Chennai

**DEPARTMENT OF INFORMATION TECHNOLOGY**  
**LAB MANUAL**

**CS23432 – Software Construction**

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<b>Exp.No: 1</b>	<b>AZURE DEVOPS ENVIRONMENT SETUP</b>
<b>Date:22/01/2025</b>	

**AIM:** To set up and access the Azure DevOps environment by creating an organization through the Azure Portal.

## INSTALLATION

1. Open your web browser and go to the Azure website:

<https://azure.microsoft.com/en-us/getstarted/azure-portal>.

Sign in using your Microsoft account credentials.

If you don't have a Microsoft account, you can create one here: <https://signup.live.com/?lic=1>

Check out the how-to video series for tips on deploying your cloud workloads from the Azure portal. >

**Azure mobile app**  
Stay connected to your Azure resources—anytime, anywhere. Now available for iOS and Android.  
[Learn more >](#)

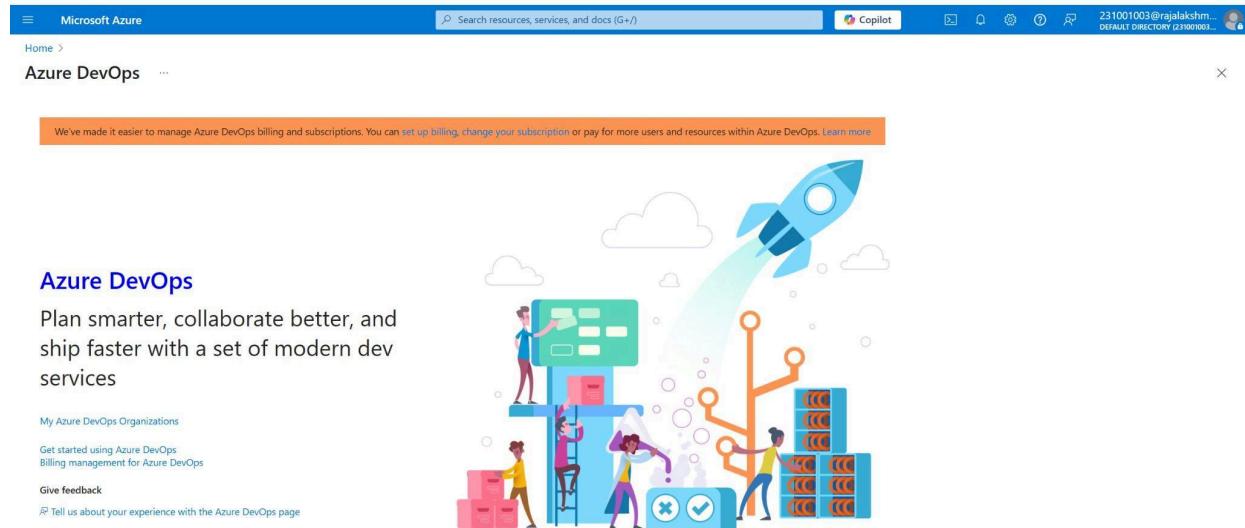
## 2. Azure home page

The screenshot shows the Microsoft Azure home page. At the top, there's a search bar and a Copilot button. Below the header, there's a section for "Azure services" with icons for creating a resource, Subscriptions, All resources, Azure DevOps organizations, Quickstart Center, Azure AI services, Kubernetes services, Virtual machines, App Services, and More services. The "Resources" section shows recent and favorite resources, including "MYBANKAPP" (Azure Load Testing) and "BankProject" (Resource group). The "Navigate" section includes links for Subscriptions, Resource groups, All resources, and Dashboard. The "Tools" section features Microsoft Learn, Azure Monitor, Microsoft Defender for Cloud, and Cost Management. The "Useful links" section provides links to Technical Documentation, Azure Services, Recent Azure Updates, and the Azure mobile app. The "Azure mobile app" section shows download links for the App Store and Google Play.

3. Open DevOps environment in the Azure platform by typing **Azure DevOps Organizations** in the search bar.

This screenshot is similar to the previous one but with a search bar at the top containing the text "devops". The search results are displayed below the header, showing "Services" (with items like Azure Native New Relic Service, Managed DevOps Pools, Azure DevOps organizations, and Azure Native Dynatrace Service), "Marketplace" (with items like Static Web App, Rocky Linux 9, and Build Agents for Azure DevOps), and "Documentation" (with items like Introduction to DevOps - Training, Course AZ-400T00-A: Designing and Implementing Microsoft DevOps solutions - T..., Managed DevOps Pools Overview - Managed DevOps Pools, DevOps considerations - Cloud Adoption Framework, and Continue searching in Microsoft Entra ID). The rest of the page layout remains the same, including the "Resources", "Tools", "Useful links", and "Azure mobile app" sections.

- Click on the ***My Azure DevOps Organization*** link and create an organization and you should be taken to the Azure DevOps Organization Home page.



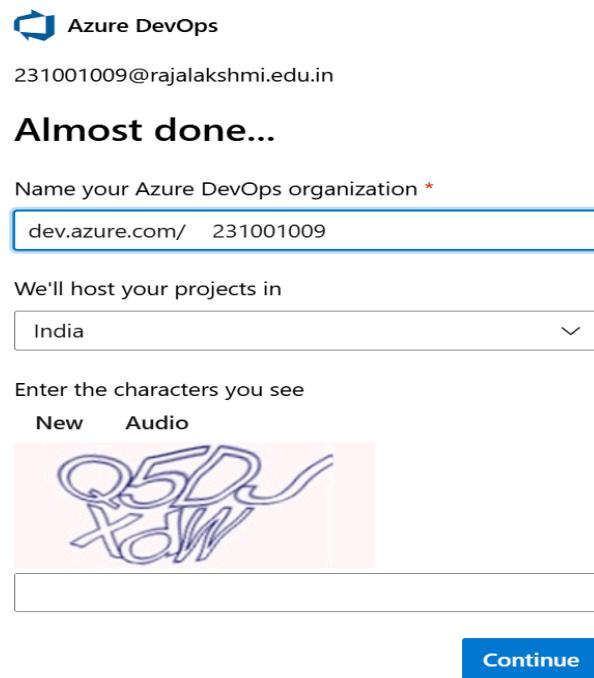
**RESULT:** Successfully accessed the Azure DevOps environment and created a new organization through the Azure portal.

<b>Exp.No: 2</b>	<b>AZURE DEVOPS PROJECT SET UP AND USER STORY MANAGEMENT</b>
<b>Date: 07/02/2025</b>	

**AIM:** To set up an Azure DevOps project for efficient collaboration and agile work management.

**STEPS:**

1. Create An Azure Account



The screenshot shows the final step of creating an Azure DevOps organization. It includes the organization name, location, reCAPTCHA, and a 'Continue' button.

**Azure DevOps**  
 231001009@rajalakshmi.edu.in

**Almost done...**

Name your Azure DevOps organization \*

dev.azure.com/ 231001009

We'll host your projects in

India

Enter the characters you see

New Audio

Q5D XoW

**Continue**

## 2. Create the First Project in Your Organization

a. After the organization is set up, you'll need to create your first **project**. This is where you'll begin to manage code, pipelines, work items, and more.

b. On the organization's **Home page**, click on the **New Project** button.

c. Enter the project name, description, and visibility options:

**Name:** Choose a name for the project (e.g., LMS).

**Description:** Optionally, add a description to provide more context about the project.

**Visibility:** Choose whether you want the project to be **Private** (accessible only to those invited) or **Public** (accessible to anyone).

d. Once you've filled out the details, click **Create** to set up your first project.

The screenshot shows the 'Create a project to get started' dialog box. At the top, it says 'Create a project to get started'. Below that is a 'Project name \*' field containing 'Crime Rate Detection'. Underneath is a 'Description' field with an empty text area. The next section is 'Visibility' with two options: 'Public' and 'Private'. The 'Private' option is selected, indicated by a blue border around its radio button. A note below says 'Only people you give access to will be able to view this project.' Below this is a note: 'Public projects are disabled for your organization. You can turn on public visibility with [organization policies](#)'. There is an 'Advanced' button with a dropdown arrow. At the bottom are 'Version control' (set to 'Git') and 'Work item process' (set to 'Basic'). At the very bottom is a blue 'Create project' button with a plus sign.

3. Once logged in, ensure you are in the correct organization. If you're part of multiple organizations, you can switch between them from the top left corner (next to your user profile). Click on the Organization name, and you should be taken to the Azure DevOps Organization Home page.

Microsoft AKSHAYA M Sign out

Azure DevOps Organizations Create new organization

AKSHAYA M Edit profile

231001009@rajalakshmi.edu.in

India 231001009@rajalakshmi.edu.in

Visual Studio Dev Essentials

Organizations Pending Deletion - [Expand](#)

#### 4. Project dashboard

Azure DevOps AnushaaMaai / Crime Rate Detection / Overview / Summary

Search

Crime Rate Detection

Private Invite

About this project

This project focuses on analyzing crime data from around the world to understand patterns and trends. By studying past incidents, we aim to uncover the root causes, frequency, and geographical distribution of various crimes.

The goal is to use these insights to recommend effective precautions and preventive measures. This includes identifying vulnerable areas, improving public awareness, and supporting law enforcement in strengthening community safety.

In the long term, the project envisions using predictive analysis to detect potential crimes before they happen. By leveraging data and AI, it also aims to assist in identifying suspects and helping authorities enforce laws more efficiently.

Project stats Period: Last 7 days

Boards

5. To manage user stories:

- From the **left-hand navigation menu**, click on **Boards**. This will take you to the main **Boards** page, where you can manage work items, backlogs, and sprints.

- On the **work items** page, you'll see the option to **Add a work item** at the top.

Alternatively, you can find a + button or **Add New Work Item** depending on the view you're in.

From the **Add a work item** dropdown, select **User Story**. This will open a form to enter details for this user story.

The screenshot shows the Azure DevOps interface for the 'Crime Rate Detection' project. The left sidebar is visible with options like Overview, Boards, Work items, Boards, Backlogs (which is selected), Sprints, Queries, Delivery Plans, and Analytics views. The main area is titled 'Crime Rate Detection Team' and shows the 'Backlog' tab selected. A table lists four backlog items, all of which are 'Epic' type and marked as 'New'. The table columns include Order, Work Item Type, Title, State, Effort, and Business Value.

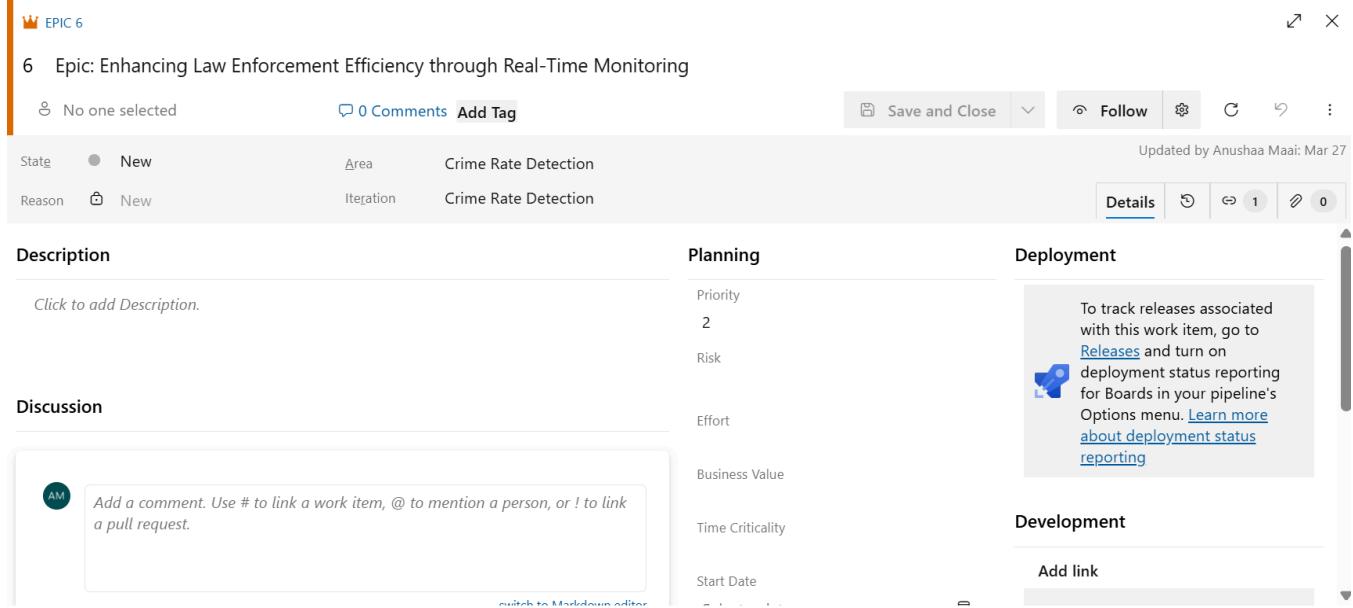
Order	Work Item Type	Title	State	Effort	Business Value
1	Epic	> 🚨 Epic: Centralized Crime Data Collection	New		
2	Epic	> 🚨 Epic: Crime Incident Collection & Monitoring	New		
3	Epic	> 🚨 Epic: Enhancing Public Safety through Crime Awareness	New		
4	Epic	> 🚨 Epic: Enhancing Law Enforcement Efficiency through Real-Ti...	New		

**RESULT:** Successfully created an Azure DevOps project with user story management and agile workflow setup.

<b>Exp.No: 3</b>	<b>SETTING UP EPICS FEATURES AND USER STORIES FOR PROJECT PLANNING</b>
<b>Date: 14/02/2025</b>	

**AIM:** To learn about how to create epics, user story, features, backlogs for your assigned project.

## 1. Fill in Epics



The screenshot shows the 'EPIC' creation screen in Microsoft Azure DevOps. At the top, it says 'EPIC 6' and 'Epic: Enhancing Law Enforcement Efficiency through Real-Time Monitoring'. Below this, there are fields for 'State' (New), 'Reason' (New), 'Area' (Crime Rate Detection), and 'Iteration' (Crime Rate Detection). On the right, there are buttons for 'Save and Close', 'Follow', and other options, along with a note that it was updated by Anushaa Maa on Mar 27. The main area is divided into sections: 'Description' (with a placeholder 'Click to add Description.'), 'Planning' (Priority: 2, Risk, Effort, Business Value, Time Criticality, Start Date), 'Deployment' (with a note about tracking releases), and 'Development' (Add link). A comment section at the bottom left says 'Add a comment. Use # to link a work item, @ to mention a person, or ! to link a pull request.'

## 2. Fill in Features

FEATURE 15

15 Real-Time Crime Tracking and Case Management

No one selected 0 Comments Add Tag

State New Area Crime Rate Detection  
Reason New Iteration Crime Rate Detection

Save and Close Follow Details

Description Click to add Description.

Planning Priority 2  
Risk  
Effort  
Business Value  
Time Criticality  
Start Date

Deployment To track releases associated with this work item, go to [Releases](#) and turn on deployment status reporting for Boards in your pipeline's Options menu. [Learn more about deployment status reporting](#)

Discussion Add a comment. Use # to link a work item, @ to mention a person, or ! to link a pull request.

Development Add link

## 3. Fill in User Story Details

USER STORY 25

25 As a user, I want to receive alerts when entering a high-crime area so that I can take necessary precautions.

No one selected 0 Comments Add Tag

State New Area Crime Rate Detection  
Reason New Iteration Crime Rate Detection\Iteration 3

Save and Close Follow Details

Description Click to add Description.

Acceptance Criteria

- Develop a **geofencing system** to detect when a user enters a high-risk zone.
- Implement a **notification system** to send real-time alerts via SMS, email, or push notifications.

Planning Story Points  
Priority 2  
Risk

Classification Value area  
Business

Deployment To track releases associated with this work item, go to [Releases](#) and turn on deployment status reporting for Boards in your pipeline's Options menu. [Learn more about deployment status reporting](#)

Development Add link

#### 4. Fill in Task Details

The screenshot shows the 'Task Details' page for 'TASK 29'. The task title is 'Develop a geofencing system to detect when a user enters a high-risk zone.' The task state is 'New'. The area is 'Crime Rate Detection' and the iteration is 'Crime Rate Detection\Iteration 3'. The task was updated by Anushaa Maai on May 5. The task has 0 comments and 0 tags. The task description is empty, and the discussion section contains a comment placeholder. The planning section shows a priority of 2 and an activity. The effort section shows original estimate, remaining, and completed hours. The deployment section provides instructions on tracking releases. The development section has an 'Add link' button.

Save and Close | Follow | Details | 1 | 0 | 0

State: New | Area: Crime Rate Detection | Iteration: Crime Rate Detection\Iteration 3 | Updated by Anushaa Maai: May 5

Description: Click to add Description.

Discussion: Add a comment. Use # to link a work item, @ to mention a person, or ! to link a pull request.

Planning: Priority 2 | Activity

Effort (Hours): Original Estimate | Remaining | Completed

Deployment: To track releases associated with this work item, go to [Releases](#) and turn on deployment status reporting for Boards in your pipeline's Options menu. [Learn more about deployment status reporting](#)

Development: Add link

**RESULT:** Thus, the creation of epics, features, user story and task has been created successfully.

**Exp.No: 4**

**Date: 20/03/2025**

## SPRINT PLANNING

**AIM:** To assign user story to specific sprint for the Crime Rate Detection Project.

### SPRINT PLANNING

#### Sprint 1

The screenshot shows the Azure DevOps Boards interface for the 'Crime Rate Detection' project. The left sidebar is collapsed, showing options like Overview, Boards, Work items, Backlogs, Sprints, Queries, Delivery Plans, Analytics views, Repos, Pipelines, Test Plans, Artifacts, and Project settings. The main area is titled 'Crime Rate Detection Team' and displays a Taskboard for 'Iteration 1'. The board has columns for New, Active, Resolved, and Closed. Under the 'New' column, there is a card labeled 'Unparented' which contains four user stories:

- 10 Develop a user-friendly crime report submission form. (New, assigned to AKSHAYAA MU...)
- 11 Store submitted reports securely in MongoDB. (New, assigned to Anushaa Maai)
- 17 Develop a dashboard to display trends in charts and graphs. (New, assigned to Asmitha Sree J A)
- 21 Allow users to filter (partially visible)

At the top right, there is a search bar, a 'New Work Item' button, and 'Column Options' settings. The date range 'May 5 - May 10' and '5 work days' are also displayed.

## Sprint 2

The screenshot shows the Azure DevOps Boards interface for the 'Crime Rate Detection' project. The left sidebar is collapsed, and the main area displays a Kanban board for the 'Crime Rate Detection Team'. The board has columns for 'New', 'Active', 'Resolved', and 'Closed'. Under the 'New' column, there is a section titled 'Unparented' containing four work items:

- 19 Integrate Google Maps or Leaflet.js to display a heatmap of crime locations. (New, Asmita Sree J A)
- 20 Fetch crime data from MongoDB and display it on the map. (New, AKSHAYAA MU...)
- 33 Generate a unique tracking ID for each report. (New, Anushaa Maai)
- 36 Develop a dashboard

At the top right, there are buttons for '+ New Work Item', 'Column Options', and a date range 'May 11 - May 15 4 work days'. A search bar and filter options ('Iteration 2', 'Person: All') are also visible.

## Sprint 3

The screenshot shows the Azure DevOps Boards interface for the 'Crime Rate Detection' project. The left sidebar is collapsed, and the main area displays a Backlog board for the 'Crime Rate Detection Team'. The board has columns for 'Order', 'Title', 'State', and 'Assigned To'. The backlog is organized into sections:

- Unparented Items**:
  - 1. Integrate a crime reporting system that pushes real-time ... (New, AKSHAYAA MU...)
  - 2. Display crime alerts on the dashboard with location detai... (New, Anushaa Maai)
  - 3. Allow officers to filter alerts by severity and crime type. (New, Asmita Sree J A)
  - 4. Develop a centralized case management system. (New, AKSHAYA M)
  - 5. Allow investigators to update case statuses and attach ev... (New, Anushaa Maai)
  - 6. Implement a search and filter function for active cases. (New, Asmita Sree J A)
  - 7. Integrate GPS tracking for on-duty officers. (New, AKSHAYAA MU...)
  - 8. Display officer availability and assignment details (New, AKSHAYA M)
  - 9. Enable officers to update their status (available, on duty, ... (New, AKSHAYA M))
- As a user, I want to receive alerts when entering a high-crime area.**:
  - 1. As a user, I want to receive alerts when entering a high-crime area. (New, Anushaa Maai)
  - 2. As a user, I want to see crime-prone areas on an interactive map. (New, Asmita Sree J A)
  - 3. As a police chief, I want to monitor officer locations and stat... (New, AKSHAYA M)

At the top right, there are buttons for '+ New Work Item', 'Column Options', and a date range 'May 18 - May 23 5 work days remaining'. A search bar and filter options ('Iteration 3') are also visible.

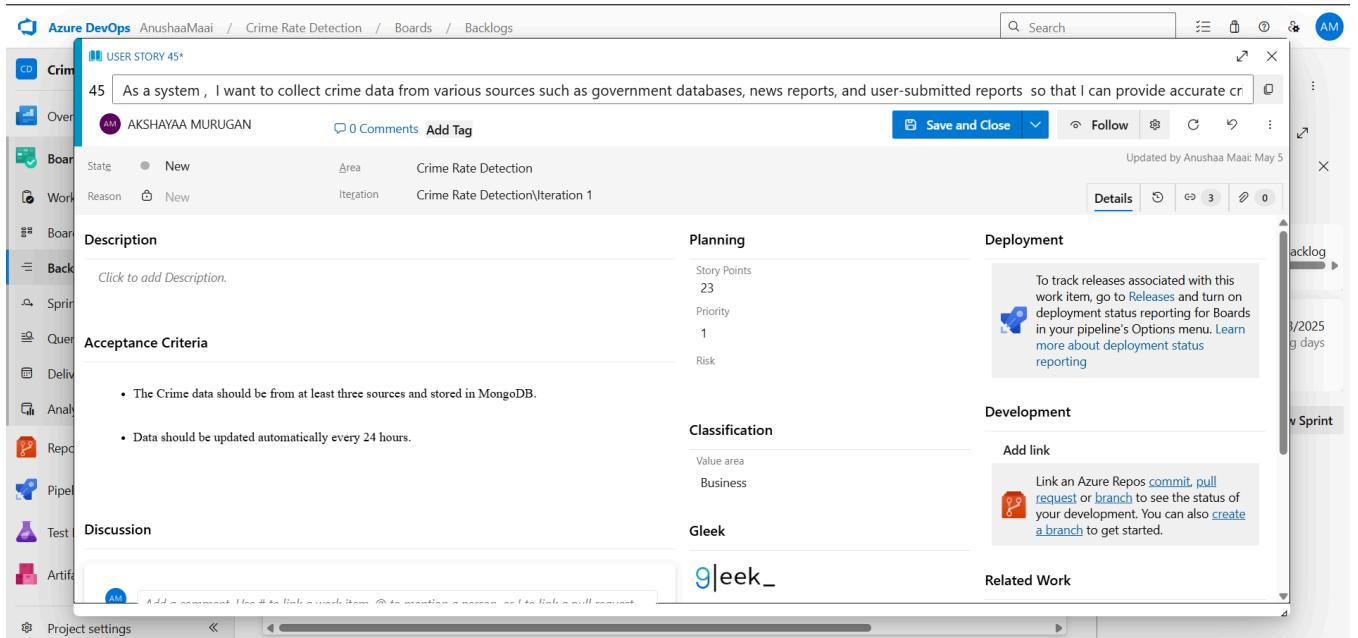
**RESULT:** The Sprints are created for the Crime Rate Detection Project.

<b>Exp.No: 5</b>
<b>Date: 28/03/2025</b>

## POKER ESTIMATION

**AIM:** Create Poker Estimation for the user stories - Crime Rate Detection Project.

### POKER ESTIMATION



The screenshot shows the Azure DevOps interface for creating a User Story. The URL is [https://dev.azure.com/AnushaaMaai/Crime%20Rate%20Detection/\\_workitems/edit/45](#). The story title is "USER STORY 45\*". The description is: "As a system , I want to collect crime data from various sources such as government databases, news reports, and user-submitted reports so that I can provide accurate crime rate detection". The author is AKSHAYAA MURUGAN, and there are 0 comments and 0 tags. The story is in the "New" state, assigned to the "Crime Rate Detection" area, and is part of the "Crime Rate Detection\Iteration 1" iteration. The planning section shows Story Points as 23, Priority as 1, and Risk as 0. The deployment section includes a note about tracking releases. The development section has a "Add link" button. The discussion section contains a comment from "Gleek" with the text "9|eek\_". The sidebar on the left shows various project management sections like Boards, Backlogs, and Work items.

**RESULT:** The Estimation/Story Points is created for the project using Poker Estimation.

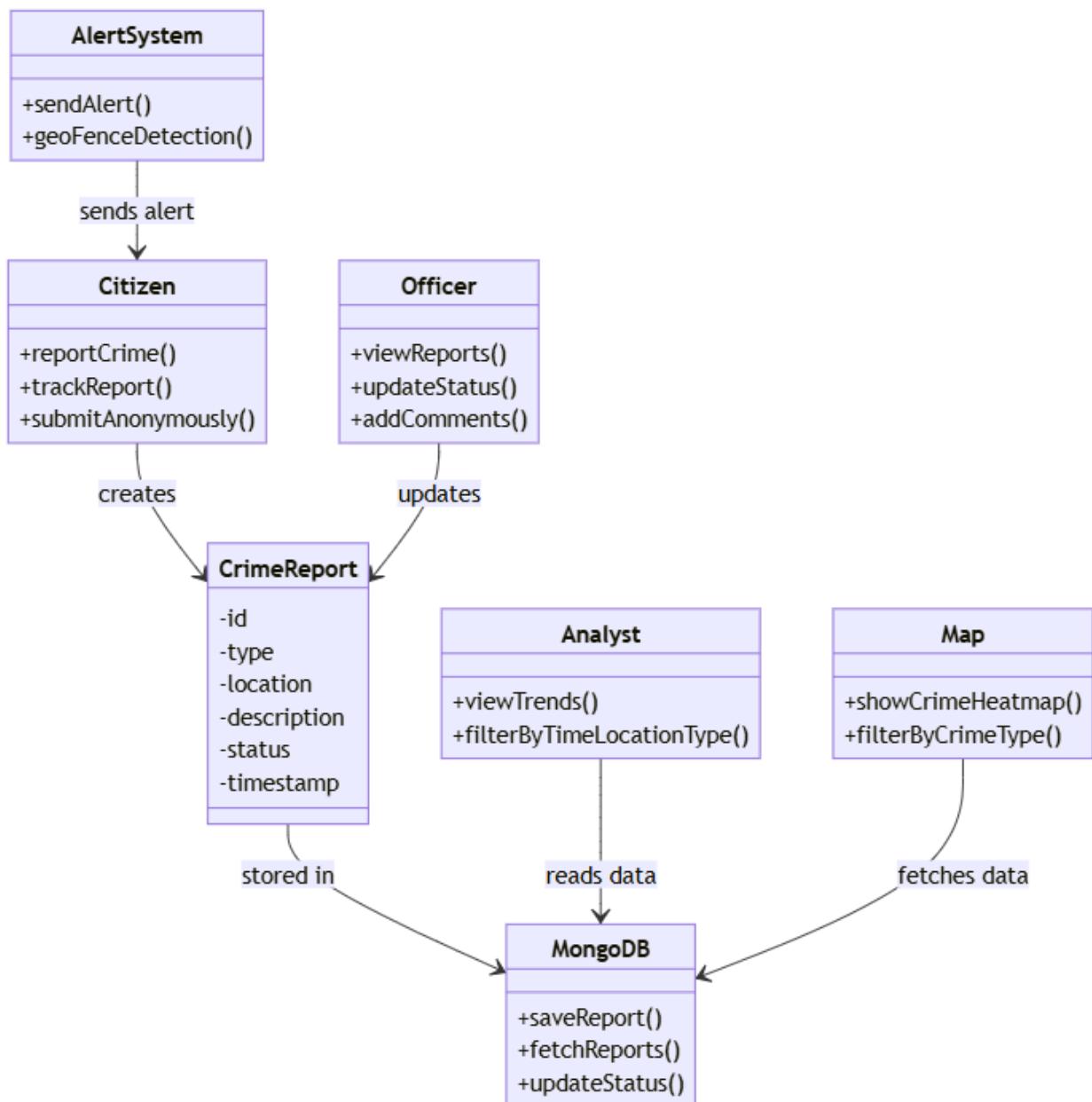
**Exp.No: 6**

**DESIGNING CLASS AND SEQUENCE DIAGRAMS FOR  
PROJECT ARCHITECTURE**

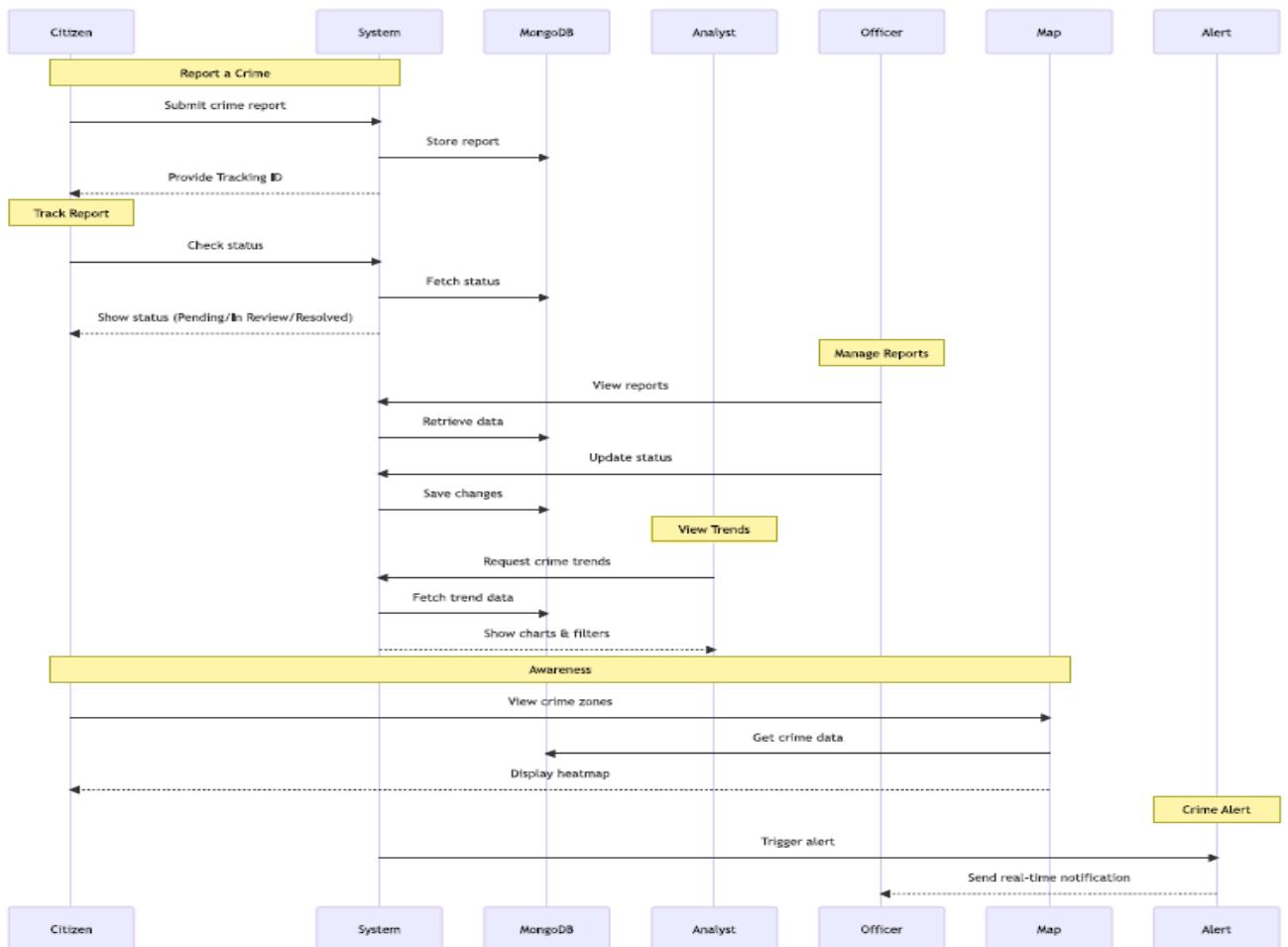
**Date: 04/04/2025**

**AIM:** To Design a Class Diagram and Sequence Diagram for the given Project.

**6A. CLASS DIAGRAM**



## 6B. SEQUENCE DIAGRAM



**RESULT:** The Class Diagram and Sequence Diagram is designed Successfully for the Crime Rate Detection Project.

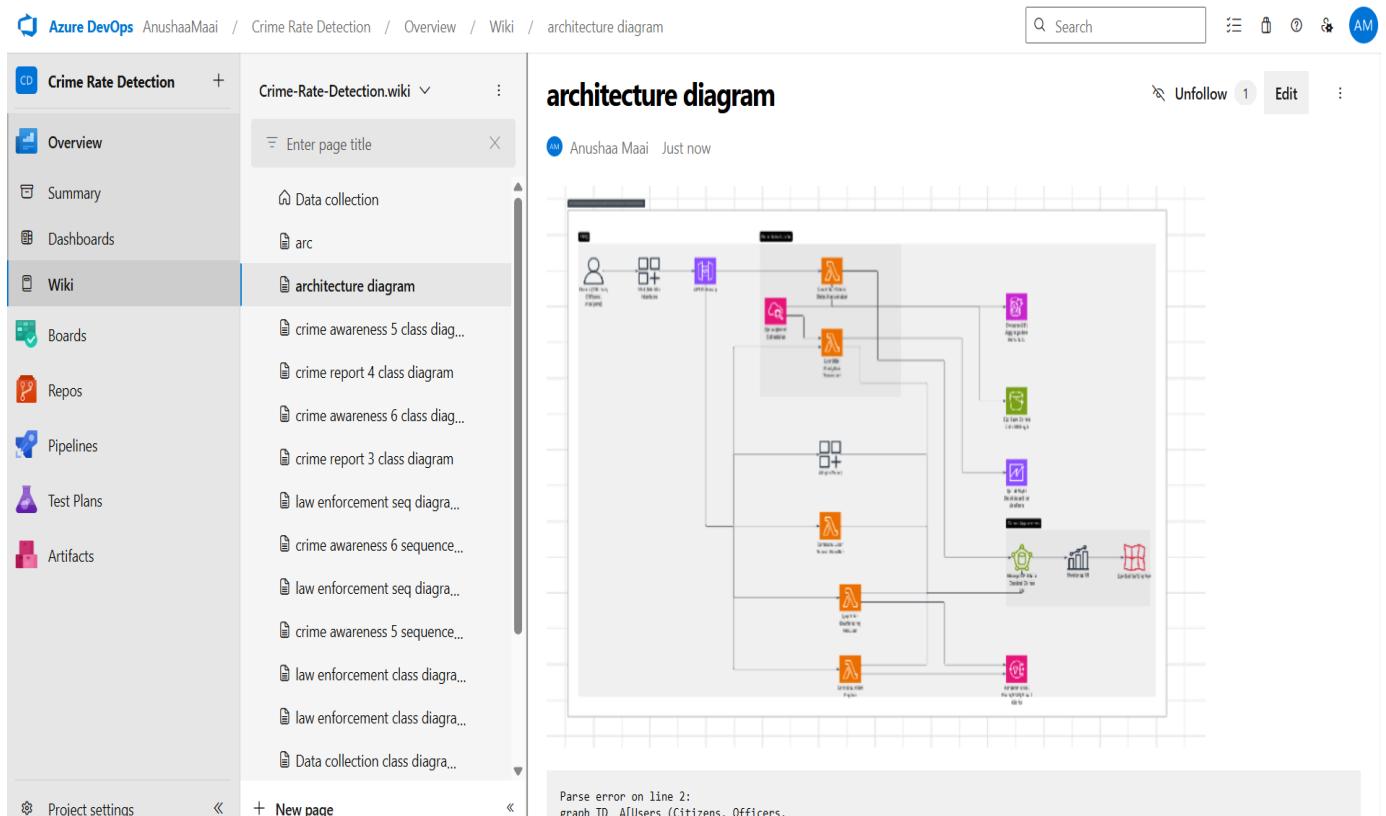
**Exp.No: 7**

**Date: 16/04/2025**

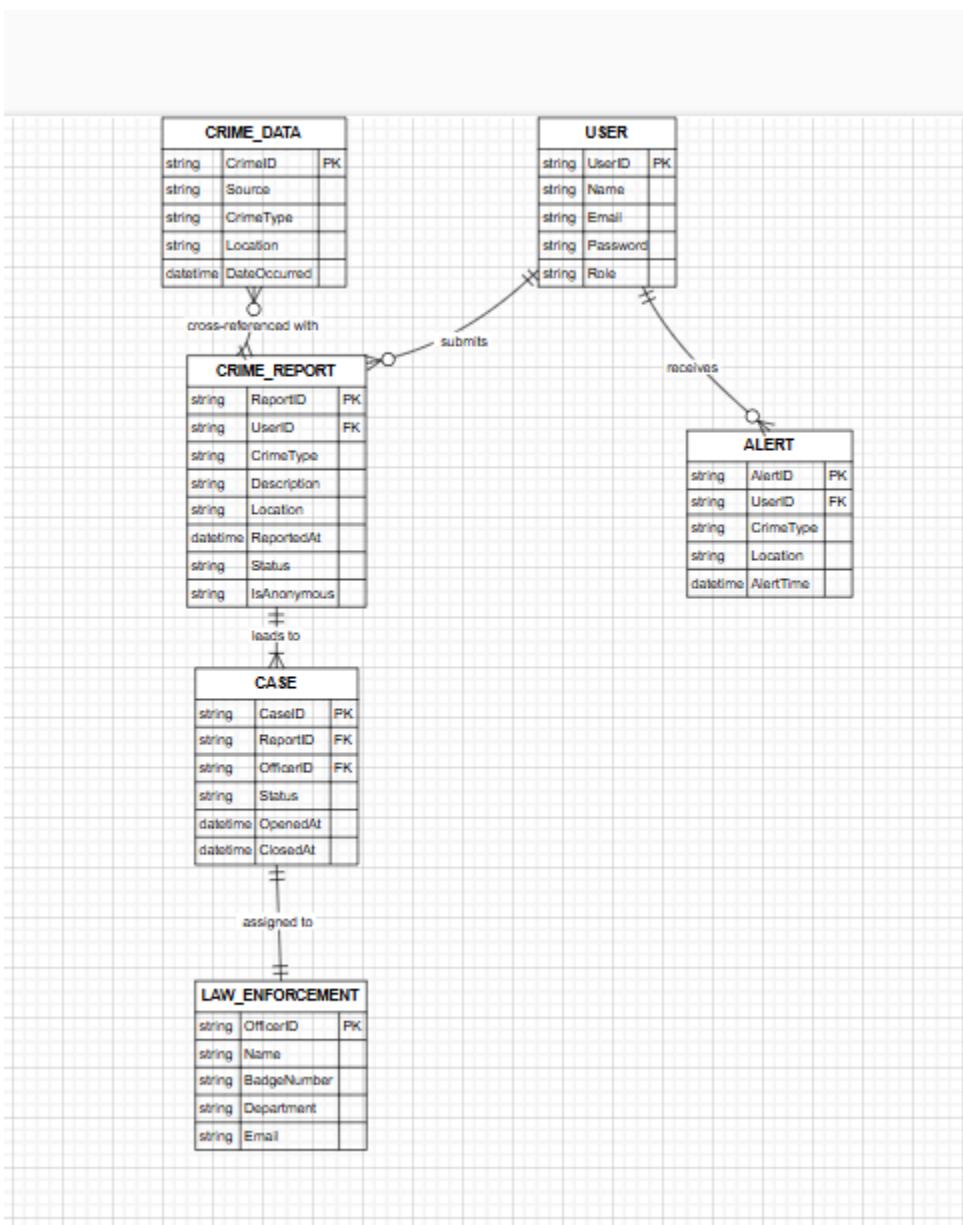
## **DESIGNING ARCHITECTURAL AND ER DIAGRAMS FOR PROJECT STRUCTURE**

**AIM:** To Design an Architectural Diagram and ER Diagram for the given Project.

### **7A. ARCHITECTURAL DIAGRAM**



## 7B. ER DIAGRAM



**RESULT:** The Architecture Diagram and ER Diagram is designed Successfully for the Crime Rate Detection Project.

<b>Exp.No: 8</b>	<b>TESTING-TEST PLANS AND TEST CASES</b>
<b>Date: 18/04/2025</b>	

**AIM:** Test Plans and Test Case and write two test cases for at least five user stories showcasing the happy path and error scenarios in azure DevOps platform.

## **TEST PLANNING AND TEST CASE**

### **Test Case Design Procedure**

#### 1. Understand Core Features of the Application

- User Authentication and Access Control
- Crime Data Collection and Aggregation
- Real-Time Crime Reporting and Monitoring
- Real-Time Crime Alerts
- Geofencing and Crime Heatmap Visualization
- Crime Analytics and Trend Reporting
- Suspect and Case Management
- Officer Deployment and Tracking

#### 2. Define User Interactions

Each test case reflects realistic user actions:

- Submit Crime Report
- Track Report Status
- View Crime Map
- Receive Alerts
- Officer Reviews Reports
- System Fetches Data
- Admin Updates Dashboard

### 3. Design Happy Path Test Cases

- Focused on successful flows where inputs are valid and systems behave as expected.
- Examples:
  - Officer logs in with valid credentials
  - Receives reports successfully
  - Views crime map or crime details

### 4. Design Error Path Test Cases

- Focused on handling invalid, missing, or unexpected inputs.
- Examples:
  - Officer tries to log in with incorrect credentials.
  - Crime report submission fails due to missing location.
  - Tracking fails due to invalid tracking ID.

## 5. Break Down Steps and Expected Results

Each test case includes:

- Clear step-by-step actions
- Specific expected results for each step  
This ensures reproducibility and easy automation later.

### 6. Use Clear Naming and IDs

- Example:
  - TC85 – Collecting Crime Data from Multiple Sources
  - TC89 – Reporting crimes in the system
  - TC91 – Receiving Real-Time Crime Alerts
- Helps trace test cases to user stories and features in Azure DevOps

## 7. Separate Test Suites

Organize test cases based on functional modules:

- TS01 – Crime Data Collection
- TS02 – Crime Alerts
- TS03 – Crime reporting
- TS04 – Crime Areas

### 1. New test plan

The screenshot shows the Azure DevOps interface for creating a new test plan. The left sidebar shows the project navigation with 'Crime Rate Detection' selected. Under 'Test Plans', 'Test plans' is selected. The main area is titled 'New Test Plan'. The 'Name' field contains 'Crime Rate Detection-Functional Validation'. The 'Area Path' dropdown is set to 'Crime Rate Detection'. The 'Iteration' dropdown is set to 'Crime Rate Detection\Iteration 2' with a date range of '5/11/2025 - 5/15/2025'. At the bottom right are 'Create' and 'Cancel' buttons.

## 2. Test suite

The screenshot shows the Azure DevOps Test Plan interface for a project named 'Crime Rate Detection'. The left sidebar navigation includes 'Overview', 'Boards', 'Repos', 'Pipelines', 'Test Plans' (selected), 'Test plans', 'Progress report', 'Parameters', 'Configurations', 'Runs', and 'Artifacts'. The main area displays the 'Crime Rate Detection-Crime Data Aggression (ID: 73)' test suite, which was created on May 5 - May 10. The 'Define' tab is selected. A context menu is open over the 'Crime Rate Detection-Crime Data Aggression' suite, listing options: 'New Suite', 'Static suite', 'Requirement based suite', 'Query based suite', 'Assign configurations', 'Export', 'Assign testers to run all tests', and 'Import test suites'. Below the suite list, there's an illustration of a person painting on a canvas with a dog nearby, and a section titled 'Add a test case' with a sub-instruction 'Use this tab to collate, add and manage test cases' and a 'New Test Case' button.

## 3. Test case

Give two test cases for at least five user stories showcasing the happy path and error scenarios in azure DevOps platform.

Crime Rate Detection– Test Plans

### User Stories – Crime Rate Detection

- **US45:** As a system , I want to collect crime data from various sources such as government databases, news reports, and user-submitted reports so that I can provide accurate crime insights.
- **US60:** As a police officer, I want to receive real-time alerts on reported crimes so that I can respond quickly and efficiently.
- **US51:** As a citizen, I want to report a crime through a secure platform so that authorities can take appropriate action.
- **US66:** As a user, I want to see crime-prone areas on an interactive map so that I can stay informed and avoid dangerous locations.

## TEST SUITE: TS01 – CRIME DATA COLLECTION (ID: 84)

### Test Case: TC01 – Collecting crime data from multiple sources

**User Story:** As a system , I want to collect crime data from various sources such as government databases, news reports, and user-submitted reports so that I can provide accurate crime insights.

**Test Type:** Happy Path

#### Steps and Expected Results:

- **Action:** Trigger the scheduled data collection job.  
**Expected Result:** System attempts to connect to all sources.
- **Action:** One data source (e.g., news API) is unavailable.  
**Expected Result:** System logs an error for that source and skips it.
- **Action:** Continue fetching data from remaining available sources.  
**Expected Result:** Data from available sources is stored successfully; a warning is logged for the skipped source.

#### Notes:

This test simulates partial failure where not all sources are reachable. The system should still process available data and alert for any failed connections without crashing.

### Test Case: TC02 – Handling Data Source Failure

**User Story:** As a system , I want to collect crime data from various sources such as government databases, news reports, and user-submitted reports so that I can provide accurate crime insights.

**Test Type:** Error Path

#### Steps and Expected Results:

- **Action:** Trigger the data collection process (manual or scheduled)  
**Expected Result:** The system begins fetching data from all configured sources
- **Action:** Simulate one source failure (e.g., government API returns 500 error)  
**Expected Result:** System logs the failure but continues fetching from the other sources
- **Action:** Complete the process and store data  
**Expected Result:** Data from the successful sources is stored in MongoDB; an alert is logged for the failed one

#### Notes:

Verifies system resilience when an external data source becomes temporarily unavailable.

## TEST SUITE: TS02 – CRIME ALERTS (ID: 86)

### Test Case: TC01 – Receiving real-time crime alerts

**User Story:** As a police officer, I want to receive real-time alerts on reported crimes so that I can respond quickly and efficiently.

**Test Type:** Happy Path

#### Steps and Expected Results:

- **Action:** A new crime is reported through the system (user form or external source)  
**Expected Result:** The crime data is received and processed successfully by the backend
- **Action:** Real-time alert is generated and pushed to the officer's dashboard or mobile device  
**Expected Result:** Officer receives a notification with crime type, location, and timestamp
- **Action:** Officer clicks on the alert to view full details  
**Expected Result:** Full report opens with actionable information like suspect details, severity, and map view

### Test Case: TC02 – Filtering Fails due to backend timeout

**User Story:** As a police officer, I want to receive real-time alerts on reported crimes so that I can respond quickly and efficiently.

**Test Type:** Error Path

#### Steps and Expected Results:

- **Action:** Open the real-time alert dashboard and apply a filter (e.g., "Severity = High")  
**Expected Result:** System attempts to filter alerts
- **Action:** Backend service experiences a timeout while processing filter request  
**Expected Result:** An error message appears (e.g., “Unable to filter alerts, please try again later”)
- **Action:** Retry after some time  
**Expected Result:** Filtered results load correctly when backend recovers

## **TEST SUITE: TS03 – CRIME REPORTING (ID: 89)**

### **Test Case: TC01 – Reporting crimes in the system**

**User Story:** As a citizen, I want to report a crime through a secure platform so that authorities can take appropriate action.

**Test Type:** Happy Path

#### **Steps and Expected Results:**

- **Action:** Navigate to the "Report Crime" page  
**Expected Result:** A secure form with input fields (crime type, description, location, etc.) is displayed
- **Action:** Fill in valid details and click "Submit"  
**Expected Result:** The report is submitted successfully and confirmation message is shown
- **Action:** Check backend or admin dashboard for new report entry  
**Expected Result:** The new crime report appears in the system with a unique ID and timestamp

### **Test Case: TC02 – Reporting Crime with Missing Required Fields**

**User Story:** As a citizen, I want to report a crime through a secure platform so that authorities can take appropriate action.

**Test Type:** Error Path

#### **Steps and Expected Results:**

- **Action:** Navigate to the "Report Crime" page  
**Expected Result:** The crime reporting form is displayed
- **Action:** Leave required fields (e.g., description or location) empty and click "Submit"  
**Expected Result:** Form validation fails; error message is shown (e.g., "Location is required")
- **Action:** Try to proceed without correcting the input  
**Expected Result:** Submission is blocked until all required fields are properly filled

## TEST SUITE: TS04 – CRIME AREAS (ID: 92)

### Test Case: TC01 – Viewing Crime-Prone Areas on an Interactive Map

**User Story:** As a user, I want to see crime-prone areas on an interactive map so that I can stay informed and avoid dangerous locations.

**Test Type:** Happy Path

#### Steps and Expected Results:

- **Action:** Navigate to the crime map section of the application  
**Expected Result:** An interactive map is displayed with default view centered on user's city or region
- **Action:** Zoom or pan across different areas on the map  
**Expected Result:** Crime data dynamically updates and highlights high-risk zones
- **Action:** Click on a highlighted (crime-prone) area  
**Expected Result:** A popup or sidebar appears showing recent crimes, types, and timestamps for that location

### Test Case: TC02 – Map Fails to Load Due to API Error

**User Story:** As a user, I want to see crime-prone areas on an interactive map so that I can stay informed and avoid dangerous locations.

**Test Type:** Error Path

#### Steps and Expected Results:

- **Action:** Navigate to the crime map section of the application  
**Expected Result:** The map fails to load due to a backend/API error
- **Action:** System attempts to retrieve map data from the crime data API  
**Expected Result:** API returns error (e.g., 500 Internal Server Error), and map cannot display data
- **Action:** System displays error fallback UI  
**Expected Result:** User sees a message like “Unable to load map data. Please try again later.”

## Test Cases

AnushaaMai / Crime Rate Detection / Test Plans / Crime Rate Detection-Funct...

NEW TEST CASE \*

### Collecting Crime Data from Multiple Sources

Anushaa Maa 0 Comments Add Tag

State: Design Area: Crime Rate Detection  
Reason: New Iteration: Crime Rate Detection\Iteration 2

Steps

Steps	Action	Expected result	Attachment
2.	Fetch data from: <ul style="list-style-type: none"><li>Government API</li><li>News API</li><li>User-submitted form</li></ul>	Data is retrieved from all three sources without errors	
3.	Store the collected data in MongoDB	All records are saved in the MongoDB database, and duplicates are handled	

Click or type here to add a step

Parameter values

Deployment

To track releases associated with this work item, go to [Releases](#) and turn on deployment status reporting for Boards in your pipeline's Options menu. [Learn more about deployment status reporting](#)

Development

Add link

Link an Azure Repos [commit](#), [pull request](#) or [branch](#) to see the status of your development. You can also [create a branch](#) to get started.

Related Work

Add link

Add an existing work item as a parent

Save and Close

NEW TEST CASE \*

### Handling Data Source Failure

Anushaa Maa 0 Comments Add Tag

State: Design Area: Crime Rate Detection  
Reason: New Iteration: Crime Rate Detection\Iteration 2

Steps

Steps	Action	Expected result	Attachment
1.	Trigger the data collection process (manually or via scheduler)	The system attempts to fetch data from all three configured sources	
2.	Simulate failure of one source (e.g., government API returns 500 error)	The system logs an error for the failed source but continues fetching from the other two sources.	
3.	Complete the collection cycle and write to MongoDB	Data from the two available sources is stored; an alert or warning entry is created for the failure	

Click or type here to add a step

Parameter values

Deployment

To track releases associated with this work item, go to [Releases](#) and turn on deployment status reporting for Boards in your pipeline's Options menu. [Learn more about deployment status reporting](#)

Development

Add link

Link an Azure Repos [commit](#), [pull request](#) or [branch](#) to see the status of your development. You can also [create a branch](#) to get started.

Related Work

Add link

Add an existing work item as a parent

Save and Close

**NEW TEST CASE \***

### Receiving Real-Time Crime Alerts

Anushaa Maai 0 Comments Add Tag

Save and Close

State	Design	Area	Crime Rate Detection
Reason	New	Iteration	Crime Rate Detection\Iteration 2

**Steps**

Click or type here to add a step

**Parameter values**

**Deployment**

To track releases associated with this work item, go to [Releases](#) and turn on deployment status reporting for Boards in your pipeline's Options menu. [Learn more about deployment status reporting](#)

**Development**

Add link

Link an Azure Repos [commit](#), [pull request](#) or [branch](#) to see the status of your development. You can also [create a branch](#) to get started.

**Related Work**

Add link

Add an existing work item as a parent

**TEST CASE 95\***

### 95 Filtering Fails Due to Backend Timeout

Anushaa Maai 0 Comments Add Tag

Save and Close

State	Design	Area	Crime Rate Detection
Reason	New	Iteration	Crime Rate Detection\Iteration 2

Updated by Anushaa Maai: Yesterday

**Steps**

Click or type here to add a step

**Parameter values**

**Deployment**

To track releases associated with this work item, go to [Releases](#) and turn on deployment status reporting for Boards in your pipeline's Options menu. [Learn more about deployment status reporting](#)

**Development**

Add link

Link an Azure Repos [commit](#), [pull request](#) or [branch](#) to see the status of your development. You can also [create a branch](#) to get started.

**Related Work**

Add link

Add an existing work item as a parent

NEW TEST CASE \*

PIN mismatch during generation

Abinaya Manivannan 0 Comments Add Tag

Save and Close

State: Design Area: OnlineBankingSystem  
Reason: New Iteration: OnlineBankingSystem\sprint 1

Steps Summary Associated Automation

**Steps**

1. Log in to the system and navigate to the "Generate Debit Card PIN" section.

2. Enter the required card details, a new 4-digit PIN, and re-enter a *different* 4-digit PIN for confirmation.

3. Click on "Generate PIN" and observe the system feedback.

**Custom**

Test Type  
Error Path

**Deployment**

To track releases associated with this work item, go to [Releases](#) and turn on deployment status reporting for Boards in your pipeline's Options menu. [Learn more about deployment status reporting](#)

**Development**

Add link

Link an Azure Repos [commit](#), [pull request](#) or [branch](#) to see the status of your development. You can also [create a branch](#) to get started.

## 4. Installation of test

### Test and feedback

chrome web store

Search extensions and themes

Discover Extensions Themes

**Test & Feedback**

Featured 4.2 ★ (175 ratings) Share

Extension Workflow & Planning 200,000 users

**Extensions**

No access needed

These extensions don't need to see and change information on this site.

Test & Feedback Manage extensions

## Showing it as an extension

The screenshot shows the Azure DevOps Test Plans interface for a project named "Crime Rate Detection". The left sidebar is visible with options like Overview, Boards, Repos, Pipelines, Test Plans, Test plans, Progress report, Parameters, Configurations, Runs, and Artifacts. The "Test plans" section is currently selected.

In the center, there's a test plan titled "Crime Rate Detect..." with a status of "Past" and "0% run". Below it, the "Test Suites" section lists a single suite: "Crime Rate Detection-Functional Validati...". Under this suite, several test points are listed:

- As a user, I want to see crime-prone areas on an interactive map.
- As a citizen, I want to report a crime.
- As a police officer, I want to receive crime reports.
- As a system, I want to collect crime data.

A modal window titled "Extensions" is open on the right, showing the "Test & Feedback" extension with "Full access". It states: "These extensions can see and change information on this site." There are buttons for "Manage extensions" and "Run for web application".

## 5. Running the test cases

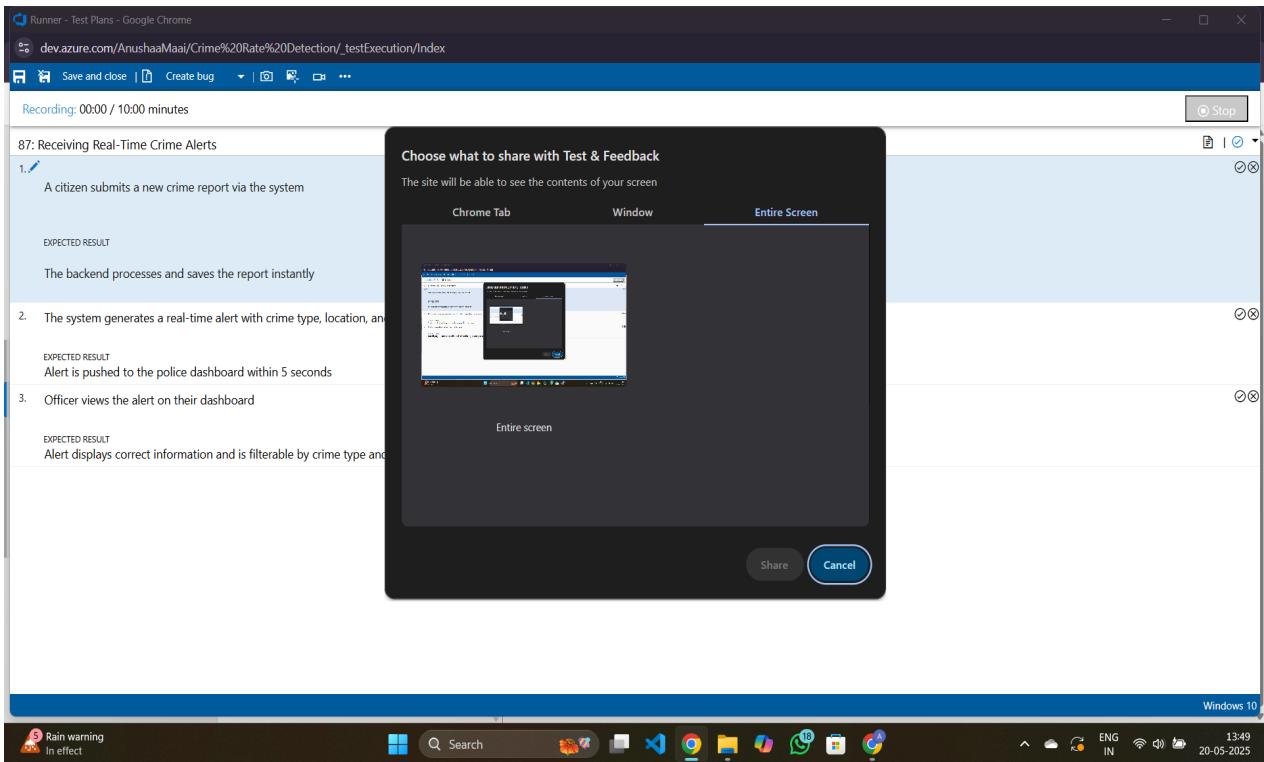
The screenshot shows the Azure DevOps Test Plans interface. On the left, the navigation bar includes 'Overview', 'Boards', 'Repos', 'Pipelines', 'Test Plans' (selected), 'Test plans', 'Progress report', 'Parameters', 'Configurations', 'Runs', and 'Artifacts'. Below this is 'Project settings'. The main area displays a test suite titled 'Crime Rate Detect...' from May 11 - May 15 (Past). It shows 0% run and a 'View report' link. The 'Execute' tab is selected. A test point titled 'As a police officer, I want to receive real-time alerts on reported crimes so that I can respond quickly and efficiently. (ID: 86)' is listed. The table below shows two items:

Title	Outcome	Order	Test Case Id
Receiving Real-Time Crime Alerts	Passed	1	87
Filtering Fails Due to Backend Timeout	Failed	2	95

The screenshot shows the 'Runner - Test Plans - Google Chrome' window. The URL is dev.azure.com/AnushaaMaij/Crime%20Rate%20Detection/\_testExecution/Index. The test plan is 'Test 1 of 2'. The first test case, '87\*: Receiving Real-Time Crime Alerts', has three steps:

1. A citizen submits a new crime report via the system. EXPECTED RESULT: The backend processes and saves the report instantly. Status: Passed.
2. The system generates a real-time alert with crime type, location, and severity. EXPECTED RESULT: Alert is pushed to the police dashboard within 5 seconds. Status: Pending.
3. Officer views the alert on their dashboard. EXPECTED RESULT: Alert displays correct information and is filterable by crime type and severity. Status: Pending.

## 6. Recording the test case



## 7. Creating the bug

BUG\_NO\_1

Unassigned

0 comments Add tag

Save & Close

State: New Area: Crime Rate Detection

Reason: New Iteration: Crime Rate Detection\Iteration 2

Test Configuration: Windows 10

System Info

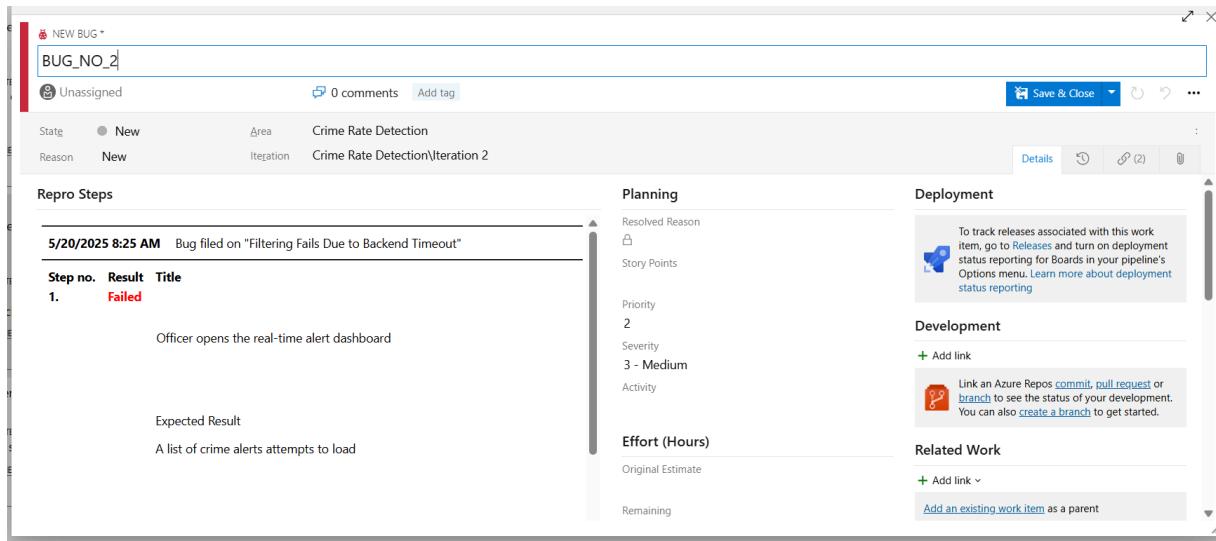
Browser - Name	Google Chrome 136
Browser - Language	en-GB
Browser - Height	816
Browser - Width	1536
Browser - User agent	Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/136.0.0.0 Safari/537.36
Operating system - Name	Windows NT 10.0; Win64; x64
Operating system - Architecture	x86_64
Operating system - Processor model	AMD Ryzen 5 5600H with Radeon Graphics
Operating system - Number of	..

Remaining: Expected Result User sees a message like "Unable to filter alerts. Please try again later."

Completed:

Gleek: 9|eek\_

System Info: Found in Build, Integrated in Build



## 8. Test case results

The screenshot shows the Azure DevOps Test Plans interface for the 'Crime Rate Detection' project. The left sidebar includes:

- Overview
- Boards
- Repos
- Pipelines
- Test Plans** (selected)
- Test plans
- Progress report
- Parameters
- Configurations
- Runs
- Artifacts
- Project settings

The main area displays the 'Crime Rate Detection' test plan, which is currently in the 'Past' phase (May 11 - May 15). It shows the following sections:

- Test Suites:** Crime Rate Detection-Functional Validati... (selected), As a user, I want to see crime-pro... ., As a citizen, I want to report a cri... ., As a police officer, I want to recei... ., As a system, I want to collect crim...
- Test Points (2 items):**
  - Receiving Real-Time Crime Alerts
  - Filtering Fails Due to Backend Tim...** (selected)
- Test Case Results:** Filtering Fails Due to Backend Timeout

**Test Case Results:** Filtering Fails Due to Backend Timeout

Outcome	TimeSta...	Configuration	Run by	Tester	Test
In Progress	4m ago	Windows 10	Anushaa Maai	Anushaa Maai	Crime
Failed	1h ago	Windows 10	Anushaa Maai	Anushaa Maai	Crime
Passed	1h ago	Windows 10	Anushaa Maai	Anushaa Maai	Crime

[Open execution history for current test point](#)

## 9. Test report summary

The screenshot shows the Azure DevOps interface for the 'Crime Rate Detection' project. On the left, the 'Work items' navigation bar is selected. In the center, a 'Recently updated' section displays a bug item titled 'BUG 97 BUG\_NO\_2'. The bug details include:

- Title:** BUG 97 BUG\_NO\_2
- State:** New
- Reason:** New
- Area:** Crime Rate Detection
- Iteration:** Crime Rate Detection\Iteration 2

The 'Repro Steps' section contains a single step: "Officer opens the real-time alert dashboard". The 'Expected Result' is "A list of crime alerts attempts to load".

The 'Planning' section shows:

- Resolved Reason:
- Story Points: 0
- Priority: 2
- Severity: 3 - Medium
- Activity: 0

The 'Deployment' section includes a note: "To track releases associated with this work item, go to [Releases](#) and turn on deployment status reporting for Boards in your pipeline's Options menu. [Learn more about deployment status reporting](#)".

The 'Development' section contains a link to "Add link" and a note: "Link an Azure Repos [commit](#), [pull request](#) or [branch](#) to see the status of your development. You can also [create a branch](#) to get started."

- Assigning bug to the developer and changing state

The screenshot shows the same Azure DevOps interface after assigning the bug to a developer. The 'Repro Step' field now contains "Not fixed" and "Test Failed".

The bug details remain the same as in the previous screenshot.

The 'Planning' section shows:

- Resolved Reason:
- Story Points: 0
- Priority: 2
- Severity: 3 - Medium
- Activity: 0

The 'Deployment' section includes the same note about tracking releases.

The 'Development' section contains a link to "Add link" and the same note about linking Azure Repos.

## 10. Progress report

Screenshot of the Azure DevOps Progress report for the "Crime Rate Detection" project.

The left sidebar shows the project navigation with "Test Plans" selected. The main area displays the "Progress report" for the "Crime Rate Detection-Functional Validation" test plan.

**Summary:**

- 1 Test plans
- 6 Test points
- 6 (6 / 6) Test points run (100% Run)
- 50% (3 / 6) Pass rate (3 Passed, 3 Failed)

**Outcome trend:** Last 14 Days

Date	Not run	Passed	Failed
2025-05-07	6	0	0
2025-05-08	6	0	0
2025-05-09	6	0	0
2025-05-10	6	0	0
2025-05-11	6	0	0
2025-05-12	6	0	0
2025-05-13	6	0	0
2025-05-14	6	0	0
2025-05-15	6	0	0
2025-05-16	6	0	0
2025-05-17	6	0	0
2025-05-18	6	0	0
2025-05-19	6	0	0
2025-05-20	0	3	3
2025-05-21	0	0	6

Screenshot of the Azure DevOps Progress report for the "Crime Rate Detection" project, showing results for "Anushaa Maa (+2)".

The left sidebar shows the project navigation with "Test Plans" selected. The main area displays the "Progress report" for the "Crime Rate Detection-Functional Validation" test plan.

**Summary:**

- 1 Test plans
- 3 Test points
- 3 (3 / 3) Test points run (100% Run)
- 33% (1 / 3) Pass rate (1 Passed, 2 Failed)

**Outcome trend:** Last 14 Days

Date	Not run	Passed	Failed
2025-05-07	3	0	0
2025-05-08	3	0	0
2025-05-09	3	0	0
2025-05-10	3	0	0
2025-05-11	3	0	0
2025-05-12	3	0	0
2025-05-13	3	0	0
2025-05-14	3	0	0
2025-05-15	3	0	0
2025-05-16	3	0	0
2025-05-17	3	0	0
2025-05-18	3	0	0
2025-05-19	3	0	0
2025-05-20	0	1	2
2025-05-21	0	0	3

## 11. Changing the test template

The screenshot shows the 'All processes' section in the Azure DevOps 'Process' settings. It lists several templates under the 'Agile' category, including 'Basic (default)', 'AnushaaMaai Agile', 'Scrum', and 'CMMI'. The 'AnushaaMaai Agile' template is selected. The left sidebar includes sections for General, Security, and Boards.

Name	Description	Team proj...
Basic (default)	This template is flexible for any process and great for teams getting started with Az...	0
AnushaaMaai Agile	This template is flexible and will work great for most teams using Agile planning me...	1
Scrum	This template is for teams who follow the Scrum framework.	0
CMMI	This template is for more formal projects requiring a framework for process improv...	0

## 12. View the new test case template

The screenshot shows the 'Add a field to Test Case' dialog. It allows creating a new field named 'Test Type' of type 'Text (single line)'. The dialog also provides options to use an existing field ('Acceptance Criteria') or create a new one. The background shows the 'Steps' section of the 'AnushaaMaai' process template.

Add a field to Test Case

Definition

Add a field to store custom, queryable data about your work items.

Options

New field New group

Layout

Steps

Text (multiple lines)

Use an existing field

Field Acceptance Criteria

Create a field

Name Test Type

Type Text (single line)

Description Optionally provide a description for the field

Learn more [?](#)

Add field Cancel

The screenshot shows the Azure DevOps Settings - Process page for the 'Test Case' template. The left sidebar lists 'Organization Settings' for 'AnushaaMaai' under 'General', 'Security', and 'Boards'. The main area shows the 'Test Case' process template with sections for 'Steps' (Text (multiple lines)), 'Recent test results' (Recent test case results), 'Deployment' (Deployments), 'Development' (Links), 'Related Work', 'Status' (Priority: Integer), and 'Automation status'. A 'Custom' section is also present. Navigation tabs at the top include 'Layout', 'States', and 'Rules'. A search bar and various icons are at the top right.

**RESULT:** The test plans and test cases for the user stories is created in Azure DevOps with Happy Path and Error Path

<b>Exp.No: 9</b>	<b>LOAD TESTING AND PERFORMANCE TESTING</b>
<b>Date: 25/04/2025</b>	

**AIM:** To create an Azure Load Testing resource and run a load test to evaluate the performance of a target endpoint.

## LOAD TESTING

### Steps to Create an Azure Load Testing Resource:

Before you run your first test, you need to create the Azure Load Testing resource:

1. Sign in to Azure Portal  
Go to <https://portal.azure.com> and log in.
2. Create the Resource
  - o Go to *Create a resource* → Search for “Azure Load Testing”.
  - o Select Azure Load Testing and click Create.
3. Fill in the Configuration Details
  - o *Subscription*: Choose your Azure subscription
  - o *Resource Group*: Create new or select an existing one.
  - o *Name*: Provide a unique name (no special characters).
  - o *Location*: Choose the region for hosting the resource.
4. (Optional) Configure tags for categorization and billing.
5. Click Review + Create, then Create.
6. Once deployment is complete, click Go to resource.

Microsoft Azure

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Copilot

231001003@rajalakshmi...  
DEFAULT DIRECTORY (231001003)

Home > Create a resource > Marketplace > Azure Load Testing >

## Create a load testing resource

Basics    Encryption    Tags    Review + create

Azure Load Testing is a fully managed load-testing service that makes it easy to generate high-scale load and identify performance bottlenecks. Learn more [↗](#)

**Project details**  
Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \*: Azure for Students  
Resource group \*: (New) BankProject  
Create new

**Instance details**  
Name \*: MYBANKAPP  
Region \*: East Asia

Previous    Next    Review + create

Microsoft Azure

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Copilot

231001003@rajalakshmi...  
DEFAULT DIRECTORY (231001003)

Home > Create a resource > Marketplace > Azure Load Testing >

## Create a load testing resource

Validation passed.

Basics    Encryption    Tags    Review + create

**Basics**  
Subscription: Azure for Students  
Resource group: BankProject  
Name: MYBANKAPP  
Region: East Asia

**Encryption**  
Encryption type: MMK

Microsoft Azure

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DEFAULT DIRECTORY (231001003)

Home >

## Microsoft.CloudNativeTesting1746461401491 | Overview

Deployment

Search    Delete    Cancel    Redeploy    Download    Refresh

**Overview**

Your deployment is complete

Deployment name : Microsoft.CloudNativeTesting1746461401491  
Subscription : Azure for Students  
Resource group : BankProject

Deployment details

Next steps

Go to resource

Give feedback

Tell us about your experience with deployment

**Cost management**  
Get notified to stay within your budget and prevent unexpected charges on your bill.  
[Set up cost alerts >](#)

**Microsoft Defender for Cloud**  
Secure your apps and infrastructure  
[Go to Microsoft Defender for Cloud >](#)

**Free Microsoft tutorials**  
Start learning today >

**Work with an expert**  
Azure experts are service provider partners who can help manage your assets on Azure and be your first line of support.  
[Find an Azure expert >](#)

## Steps to Create and Run a Load Test:

Once your resource is ready:

1. Go to your Azure Load Testing resource and click Add HTTP requests > Create.
2. Basics Tab o *Test Name*: Provide a unique name.
  - o *Description*: (Optional) Add test purpose.
  - o *Run After Creation*: Keep checked.
3. Load Settings o *Test URL*: Enter the target endpoint (e.g., <https://yourapi.com/products>).
4. Click Review + Create → Create to start the test.

Create a URL-based test ... ×

[Basics](#) [Test plan](#) [Parameters](#) [Load](#) [Monitoring](#) [Test criteria](#) [Review + create](#)

Get started by creating a test for a URL, or configure an advanced load test for multiple URLs with additional options. [Learn more](#)

**Test details**  
Provide a test name and a description. Test name and description will help you identify a test in the list of tests created in this resource.

Test name \*

Test description

Run test after creation

Debug mode   
If this is enabled, the first test run will run in debug mode providing debug logs along with request and response data for failed requests. The test run in debug mode will run with only one engine and up to 10 minutes duration. [Learn more](#)

Enable advanced settings

Configure a test with multiple requests in the 'Test plan' tab. ×

[Previous](#) [Next](#) [Review + create](#)

Create a URL-based test ... ...

✓ Validation passed.

[Basics](#) [Test plan](#) [Parameters](#) [Load](#) [Monitoring](#) [Test criteria](#) [Review + create](#)

**Basics**

Test tool	JMeter
Test name	Test_5/5/2025_9:41:40 PM
Test description	
Debug mode	Disabled

**Test plan**

Test method	URL
Requests	Request1
Input data files	

**Load**

Engine instances	1
Load pattern	Linear
Concurrent users per engine	50
Test duration (minutes)	20
Ramp-up time (minutes)	1

**Load distribution**

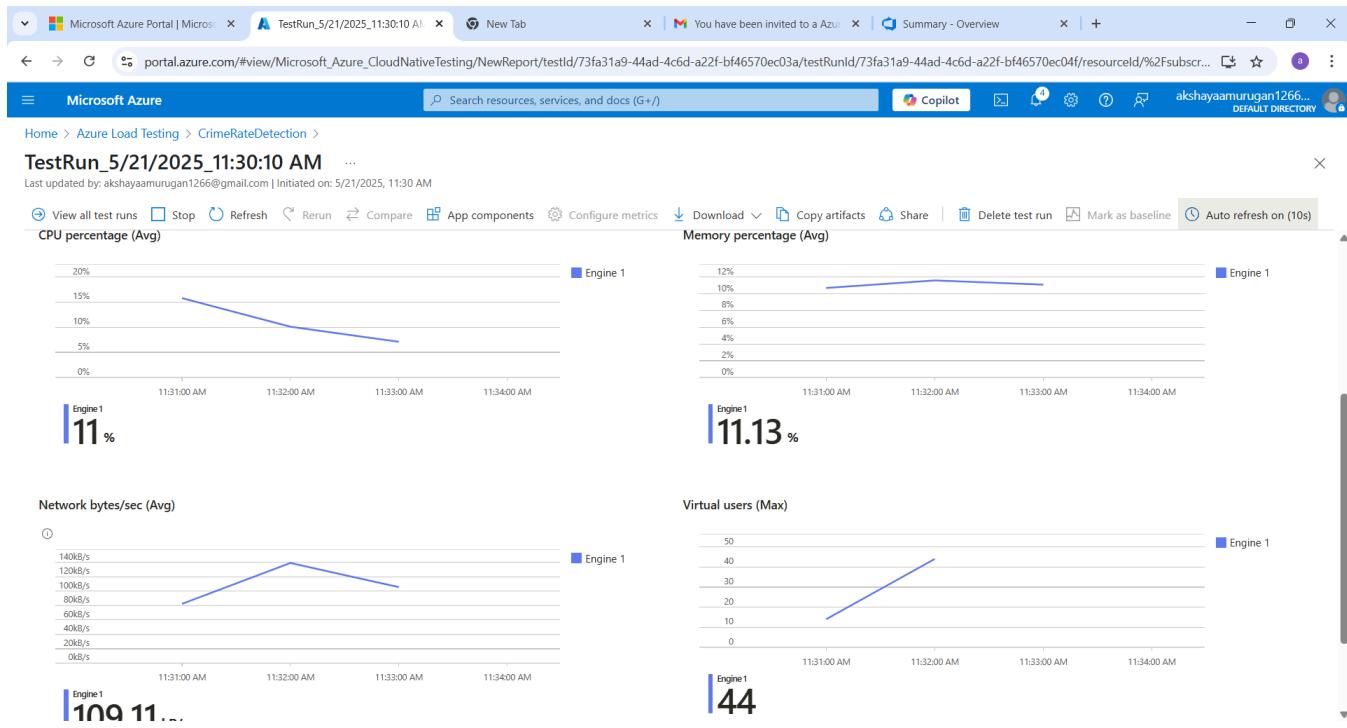
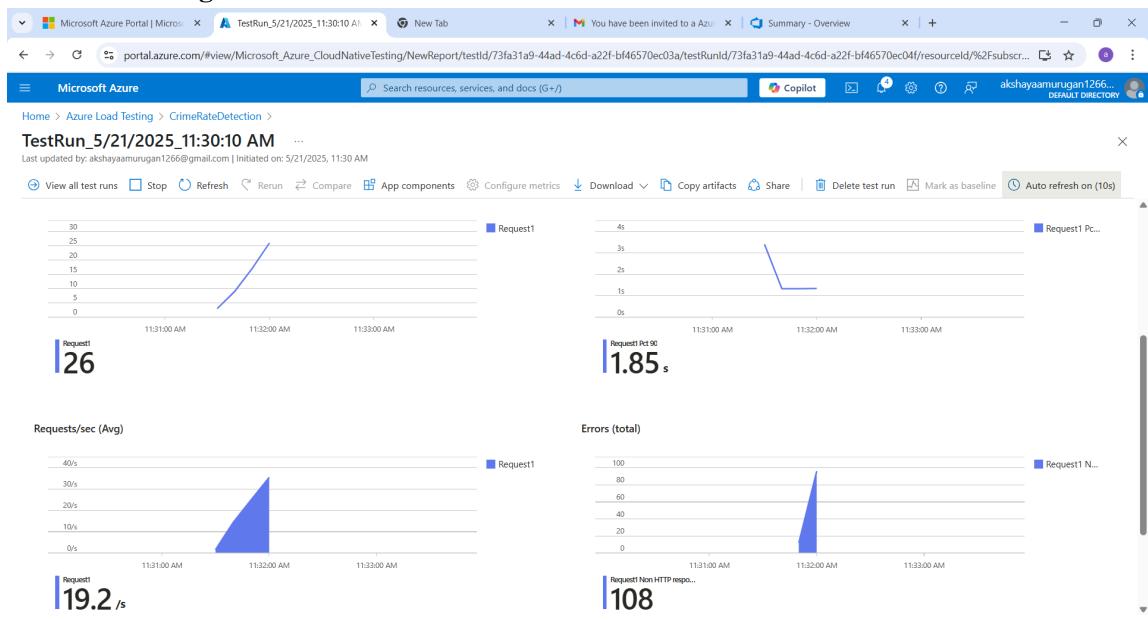
East Asia	1
-----------	---

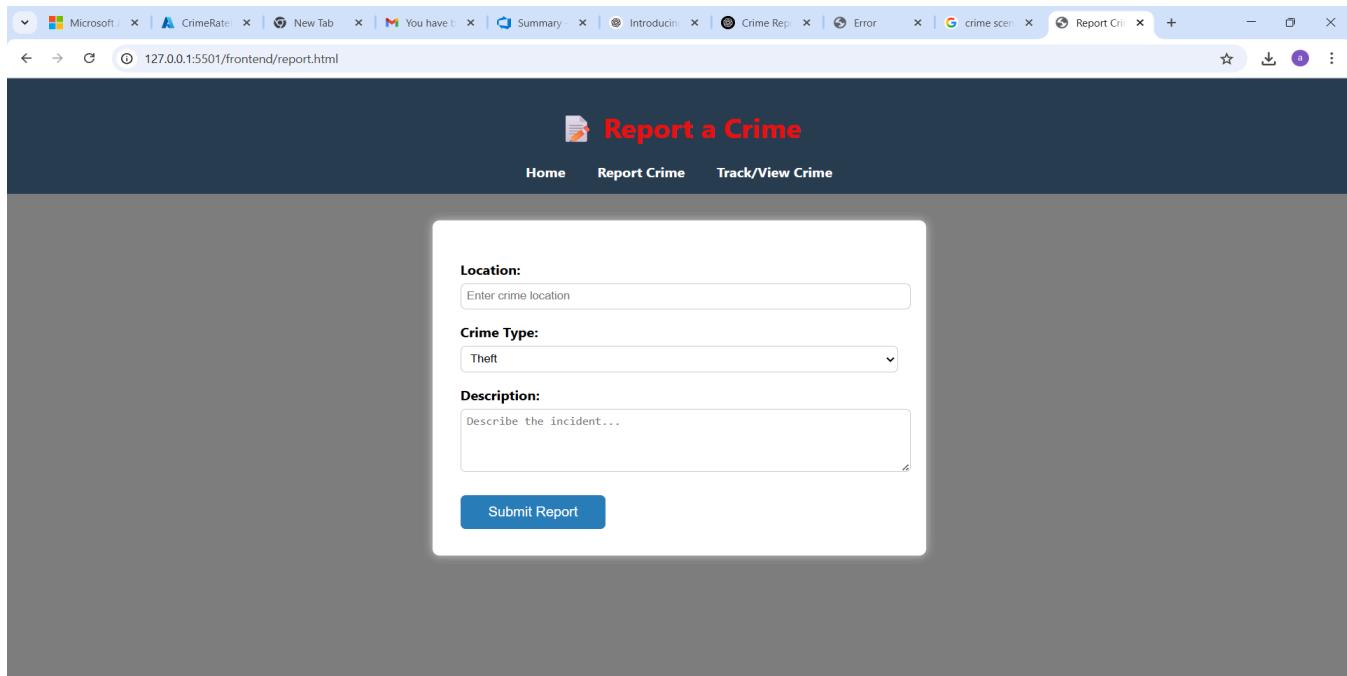
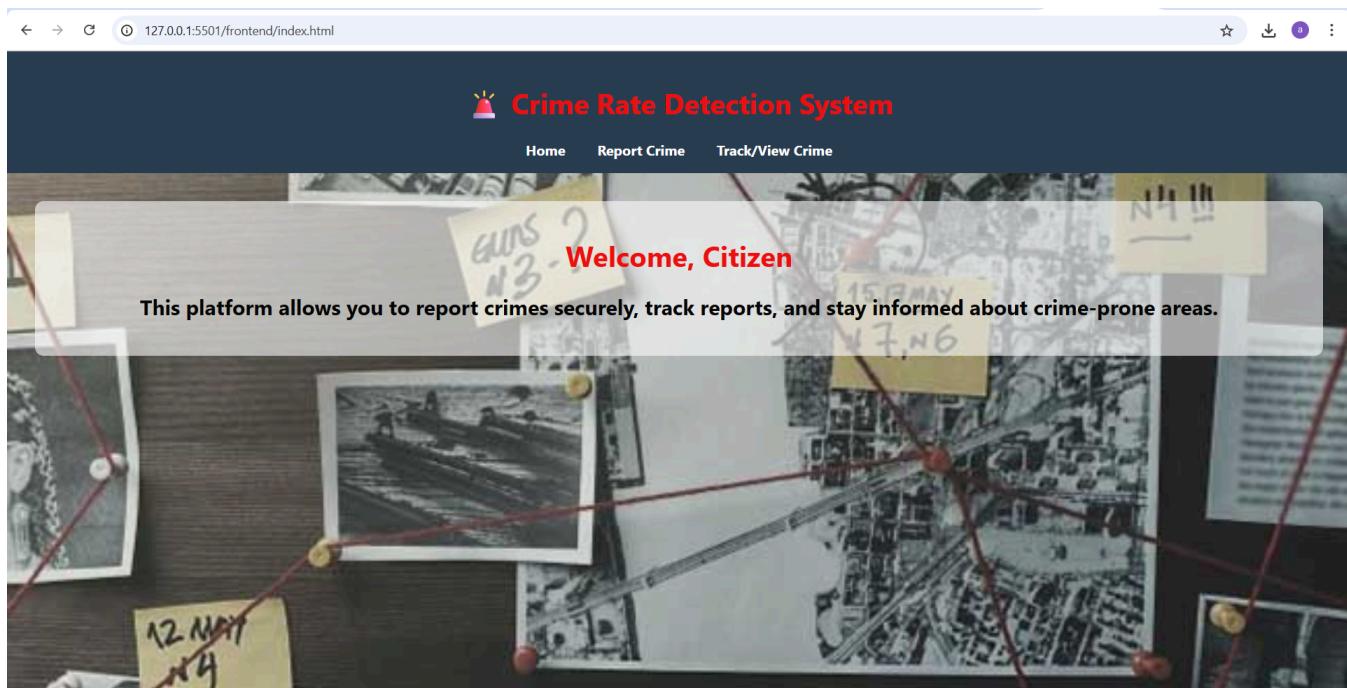
**Resources**

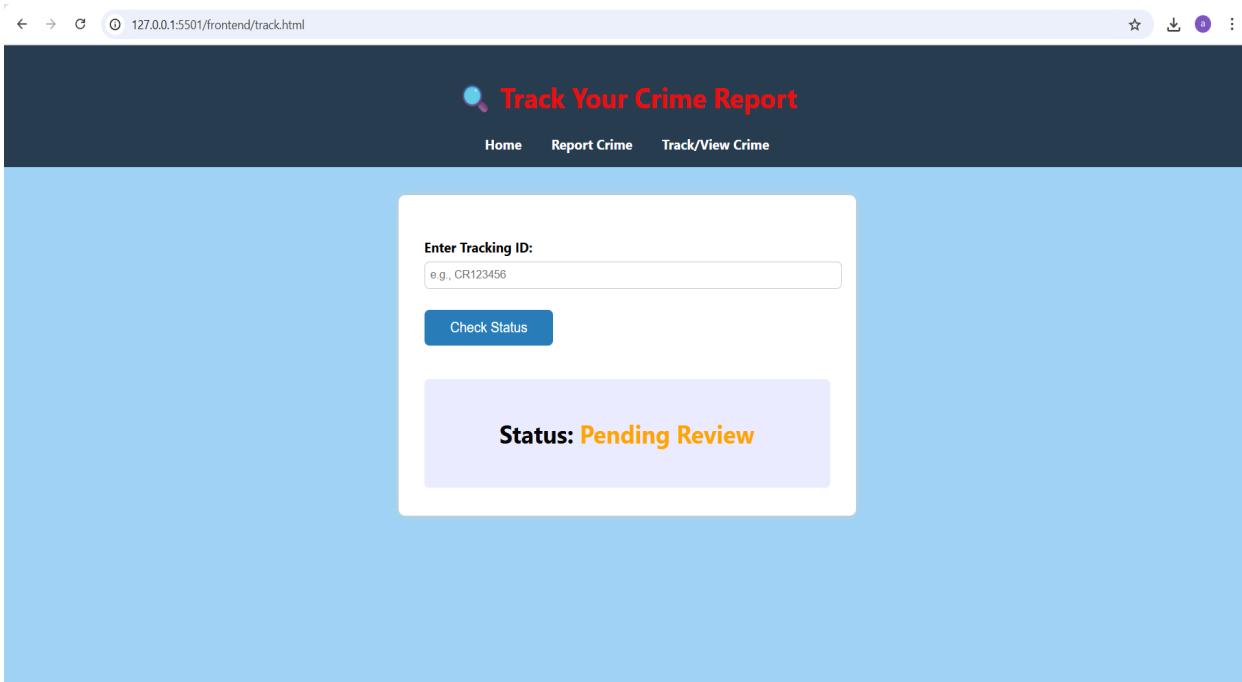
Resources	0
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[Previous](#) [Next](#) [Create](#)

## Load Testing







**RESULT:** Successfully created the Azure Load Testing resource and executed a load test to assess the performance of the specified endpoint.

**Exp.No: 10**

## GITHUB PROJECT STRUCTURE & NAMING CONVENTIONS

**AIM:** To provide a clear and organized view of the project's folder structure and file naming conventions, helping contributors and users easily understand, navigate, and extend the Crime Rate Detection project.

### GITHUB PROJECT STRUCTURE

The screenshot shows a GitHub repository page for a project named "CrimeRateDetection". The repository has a main branch, no tags, and 3 commits by user "Anushaa-ksm". The commit history includes files like Diagrams, Load Testing, Poker estimation, Progress Report, Sprint, Testing Test Plans and Test Cases, azure acc-pic, rrimeratedetection, and README.md. The README file is visible, containing the text "CrimeRateDetection". The repository has no description, website, or topics provided. It has 0 stars, 1 watching, and 0 forks. There are no releases or packages published.

File/Folder	Description	Time
Diagrams	Add files via upload	yesterday
Load Testing	Add files via upload	yesterday
Poker estimation	Add files via upload	yesterday
Progress Report	Add files via upload	now
Sprint	Add files via upload	yesterday
Testing Test Plans and Test Cases	Add files via upload	yesterday
azure acc-pic	Add files via upload	now
rrimeratedetection	Add files via upload	yesterday
README.md	Initial commit	yesterday

**RESULT:** The GitHub repository clearly displays the organized project structure and consistent naming conventions, making it easy for users and contributors to understand and navigate the codebase.