**DESIGN**

A model is a simplification of reality. A model provides the blueprints of a system. A model may be structural, emphasizing the organization of the system, or it may be behavioral, emphasizing the dynamics of the system. Use case diagram shows a set of use cases and actors (a special kind of class) and their relationships. We use case diagrams to illustrate the static view of a system. Use case diagrams are especially important in organizing and modeling the behaviors of a system. They are especially important in modeling the behavior of an interface, class, or collaboration and emphasize the event-ordered behavior of an object. A class diagram shows a set of classes, interfaces, and collaborations and their relationships. Class diagrams that include active classes address the static process view of a system.

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## UML Diagrams:

### Use case Diagram:

* Use case Diagram shows a set of use cases and actors (a special kind of class) and their relationships.
* We can utilize Use case Diagrams to illustrate the static view of a system.
* Use case Diagrams are especially important in organizing and modelling the behavior of a system.

Diagram

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***Use case diagram which shows functionality of system to achieve results for specific actor.***

### Class Diagram:

* A Class diagram is in the unified modelling language (UML) is a type of static diagram that describes a structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects.
* The classes in the Class diagram represents both main elements, interactions in the application, and the classes to be programmed.
* Two classes can be connected using relationships like Dependency, Association, Aggregation and Composition.
* Dependency is basic relationship among objects, Association represents family of links, Aggregation is variant of association relationship and Composition is stronger variant of association relationship but more specific than aggregation.

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***Class diagram which shows relationship between classes and their relationship***

* This is the Class diagram of Crime Data Analysis. Here User is the class and select category, date range, time periods, max results and Update are operations.
* Map class and Neighbourhood class have same attributes namely max. results, and the operations respectively are display map, Update and display graph, Update.
* Offense Category class and Date range class have similar operation i.e., update and the attributes respectively are: Category name and Date range, month, Year.
* Core Analysis class has attributes as: Time period, Year, month, Day Of Week, Hour and operations are: display histogram, Update.

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### Sequence Diagram:

A Sequence diagram is an interaction diagram that emphasizes the time ordering of messages.

Graphically a sequence diagram is a table that shows objects arranged in x-axis and messages ordered in increasing time along y-axis.

The above sequential diagram shows the exchange of messages between six objects: User, Offense Category, Date Range, Core Analysis, Neighborhood Analysis and Map.

User selects category from Offense Category, selects Date Range and selects Time period.

Then in the Core Analysis part it displays a Histogram to the User. Next, User selects maximum results in the neighborhood class and this displays a graph to the User.

User again selects maximum results in the Map, and this displays the Map to the User.

A picture containing table

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***Sequence Diagram which shows sequence of exchange of messages***

### Collaboration Diagram:

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***Collaboration diagram which shows relationship between class and association***

* A collaboration diagram is an interaction diagram that emphasizes the structural organization of the objects that send and receive messages. Graphically the collaboration diagram is a collection of vertices and arcs.
* The collaboration diagram has six objects: Date Range, User, Offense Category, Core Analysis, Neighbourhood Analysis, Map.

### Activity Diagram:

* An Activity diagram shows the flow of control from activity to activity.
* An activity is an ongoing execution within a state machine. It is essentially a flowchart modelling the dynamic aspects of the system.
* The above Activity diagram shows the different activities that flow in order to complete its main activity of Select Date Range, Select Offense Category and Updating database.

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***Activity Diagram which shows the different activities that flow in order to complete its main activity.***

### Component Diagram:

* Component diagrams are used to model the static implementation view of a system. This involves modelling the physical things that reside on a node, such as executables, libraries, tables, files, and documents.

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***Component diagram which shows the physical modules of the code***

Here the components are Offense Category, Neighbourhood Analysis, Core Analysis, Map and Date Range.

### Deployment Diagram:

Deployment diagrams show the configuration of run time processing nodes and the components that live on them. They model the topology of the hardware on which your system executes.

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***Depolyment diagram which shows the hardware on which system executes.***