Possible Project List for CS5570

1. **Secured transactions in E-commerce**: E-commerce is a web platform for shopping activities. Anybody can login to a vendor site (Amazon.com, Overstock.com, Halfprice.com, etc.) and execute a purchase transaction. These sites also have facilities to return purchased items, exchange items, etc. These activities are initiated with transactions. Thus, there is a transaction to place an order, a transaction to return items, etc. This project has two parts (a) develop a transactional page where you enter your order, return the items you have purchased, etc., and (b) execute a task, from login to transaction execution, securely. Assume you are a service provider and develop the entire system. This project uses a database that you will build to process these transactions. You have to create (program) a set of transactions to perform these activities.

2. **Web caching**: When you visit a web site then the browser caches the pages you have visited on the website. Next time when you visit the same site, the system tries to show you the cached pages which are likely to be stale. In this project you are to develop a fast web caching system that minimizes the possibility of getting the stale pages from the cache. This means your system must maintain cache consistency.

3. **Transaction Processing and Concurrency Control**: Database systems process transactions concurrently to improve resource utilization leading to a higher throughput. DBMS must process these transactions in a consistency-preserving manner. To do so the DBMS uses a concurrency control mechanism (scheduler). In this project you are to develop a new concurrency control mechanism (scheduler) to efficiently process concurrent transaction. Your scheduler must be cost-effective and correct.

4. **Ambulance diversion system**: When an ambulance carry a patient to a hospital, an ambulance diversion may happen. This happens when the destination hospital informs the ambulance that the destination hospital is full and cannot take any new patient. The ambulance service then must find immediately another hospital that can admit the patient. This is a real time transaction processing database system. In this project you are to develop an application system which will (a) receive the diversion notification from the first destination hospital, (b) identify/search a hospital for the patient, and (d) notify the family the address of the new hospital.

5. **Database Recovery**: A database system mail fail any time for a variety of reasons. DBS uses a recovery protocol to recover the database from such failures. In this project you are to develop a new recover protocol to recover the database from a failure.

6. **View maintenance in Data Warehousing**: In a data warehouse historical data is stored in views called "materialized" views. They have to be updated continuously while the database is processing other data. This concurrent updates must be done in a consistency-preserving manner. In this project you are to investigate existing approaches and develop your own (extension of an existing approach or a new approach) for view updates in a consistent manner.

7. **Real-time transaction processing**: Real-time transactions has fixed deadlines for completing the execution (commit). A real-time database systems must honor this deadline. If the deadline is not met then transactions have to be aborted. In this project you are to develop a transaction scheduling scheme which will schedule transactions so that they can commit within their deadline.

8. **Query processing and optimization**: Queries are pre-processed before they are converted to a set of transactions for processing. There are many ways of pre-processing a query and each way tries to minimize CPU cost and improve throughput. In this project you are to develop a query preprocessing scheme which will reformat the query and generate a query tree for processing.

9. **Patient medical record dispatch**: In a hospital doctors order many medical tests for patients. The order goes to the testing lab and the results of a test is sent back to doctors. This a highly manual-intensive. The entire reporting activity can be automated. In this project you are to develop a software module to automate the request and report process.

10. **Roll-over vehicle discovery**: If a vehicle is rolled-over in a thinly populated area and if the driver is incapacitated then such incidences are hard to detect and may cause loss of life. In this project you are to develop a vehicle roll-over reporting system which will automatically dispatch information about the event along with the address and some other useful information to the police.

11. **PTSD identification**: Post-traumatic stress disorder (PTSD) is a type of anxiety disorder. It can occur after a person has seen or experienced a traumatic event that involved the threat of injury or death. It can occur at any stage and at any time. Some of the events that caused PTSD in people were assault, domestic abuse, prison stay, rape, terrorism, war, etc. In this project you are to develop a software module to identify if a person is suffering with PTSD.

12. **Serialization identification**: Execution of concurrent transactions must be serialize to preserve database consistency. In this project you are to develop a system which will identify if a given schedule or history is serializable or recoverable or both.