# Department of Computing

**SE312: Software Construction**

**Class: BESE – 5 AB**

# Lab 5: City Search

**Date: March 29th , 2017**

**Time: Wednesday (10:00 – 13:00), Wednesday (14:00 – 17:00)**

# Instructor: Fahad Ahmed Satti

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# Lab 5: City Search

## Introduction

In this lab, you will create an application that will load data from the provided Geo City Lite CSV file to an appropriately defined database by using the hibernate ORM. Once the data has been loaded in the DB you should allow the user to search for 5 cities closest to a particular point on earth.

You can implement your design using any one of the allowed programming languages.

## Objectives

After performing this lab students will be able to understand:

* Smart Searching
* Hibernate
* Parsing CSV files

## Tools/Software Requirement

* Solutions should be made using Java and must use the ORM Hibernate.
* You can take help from internet but remember **no plagiarism.**

**Description**

The Geo City lite CSV file provides information about locations by name, region and lat/long. You must not change the CSV file or add any additional information in the DB besides a primary key. The application will start by checking the DB for any data and in case the data has not been already loaded (first execution), the CSV file is read from the class path and data is loaded in the DB.

In the 2nd part of the lab you have to allow the user to search for 5 cities closest to a point, identified by its name or a lat/long. For lat/long simply apply the nearby search to locate cities near the lat/long from the stored data. In case of city name, use reverse search to find out the lat/long for that city, before applying the same nearby search algorithm.

Latitude defines how far north or south of the equator a point is positioned.  Points alongside the equator have latitudes of zero. The North Pole has positive (north) latitude of 90, and the South Pole negative (south) latitude of -90. Accordingly, northern-hemisphere locations have positive latitude, and southern-hemisphere locations have negative latitude. Longitude describes how far east a point is, from the prime meridian: an arbitrary line on the earth surface running from pole to pole.

Latitudes are values in the range [-90, 90]. Longitudes are values in the range (-180, 180]. These values are sometimes expressed in degrees, minutes, and seconds, rather than degrees and decimals.  If you’re planning to do calculations, convert the minutes and seconds to decimals first.

The user can provide either lat/long or a city name (reverse search the lat/long), which will be utilized to look for a certain number (based on user input) of nearby cities. Remember, since the earth is not flat, you cannot apply simple arithmetic operations to find out the nearby cities, instead use the “The Great Circle Distance Formula” to find out the nearby lat/long.

You are encouraged to do some research on the internet about “The Great Circle Distance Formula” to find out how to do this task.

**Lab Task**

Your task will be to implement the following:

1. Reading data from Geo City CSV file.
2. Store the data in the DB using Hibernate.
3. Developing an interface for user to search a city and find out its latitudes and longitudes.
4. Developing an interface for user to find out 5 cities nearby a target city or lat/long.
5. Using a Version Control System (VCS) to manage your solutions.

## Deliverables

* Each submission is individual with the following composition:
  + Source Code
  + Unit Tests
  + Documentation(Introduction, Approach, Design, How to Run and Analysis)
  + Link to the public repo on GitHub
* Convert your submission files into a zip folder and name it as given below, finally upload the zip folder to LMS.
  + Name – Registration No. – Section

## Grade Criteria

This lab will be graded on the following rubric, with minimum marks 0 and maximum marks of 24:

