Study guide for Final Exam

(Final Exam on **Tuesday, Dec. 18, 2018** during 7:15PM – 9:15PM)
(**20%** of Total Credits of the course: **200 points**)
(About 40~45 questions including multiple choices,
short answers, calculations, and terminology questions)

Important concepts and terms

- Reading maps
  - Maps and modeling of the world
  - General map and thematic map
- Measurement conversion
  - Measuring a map scale
  - Conversion between degrees, minutes, and seconds (DMS) system and decimal degrees (DD) system
- Projections
  - Meridians / parallels / right angles
  - Tissot's indicatrix
  - Great circle / loxodrome
  - Azimuthal (directions) / Cylindrical / Conic
  - Equivalent (areas) / conformal (angles) / equidistant (distances) projections
- Plots
  - Box plot, Stem-and-leaf plot
  - Histogram, negative/positive skews, normal distribution
- Generalization
  - Ratio / absolute number
  - Collapse / displacement / merging / simplification / enhancement / exaggeration
- Descriptive statistics
  - Central tendency, median, mode, range, mean, standard deviation
- Classification method
  - Equal interval, quantile, standard deviation, MAX/MIN breaks, natural breaks
- Color schemes
  - Qualitative, diverging, sequential
- Map reproduction
  - Printing colors on glossy / matt papers
  - Bright light, dimmed light
  - Screening considerations & concept of screening or halftoning

- Color specification systems
    - RGB, CMYK, Munsell systems
    - Additive colors and subtractive colors – how to read certain colors in RGB and CMYK color systems
- Characteristics of Colors
    - Hue / Lightness / Saturation
- Mapping techniques
    - Bi-variate mapping and multi-variate mapping
    - Choropleth mapping, data standardization
    - Dot-density, Dot size and dot value, Three types in placing dots in a dot-density map, Proportional symbol maps, legend designs for dot-density mapping
    - Isarithmic mapping
    - Types of chorodot mapping
    - Dimensions and functions of geovisualization, 2D vs. 3D geovisualization
    - Differences between GIS and geovisualization
    - Differences between 2D and 3D geovisualization, and their related techniques
    - Advantages and challenges in geovisualization
    - Types of animated mapping, its strengths and challenges
    - Visual variables for animated mapping
    - Relationship between smoothness, magnitude (rate of change), and duration
    - Mathematical scaling and conceptual scaling
- GIS processes for mapping
    - Cluster analysis, dendrogram
    - True point vs. conceptual point
- Map critiques
    - How to criticize maps
    - Appropriate design & placing of map elements in a map
    - Visual hierarchy, Eye movement, visual center, figure-ground
    - Gestalt principles, Geometric symbols
    - Good typographies or labeling, chartjunk, bubblegraph, trilinear graph
    - Copyright and reliability issues in mapping
- Ethics in mapping
    - Examples of mis-use of GIS