

Massachusetts Institute of Technology - Department of Urban Studies and  
Planning

11.520: A Workshop on Geographic Information Systems  
11.188: Urban Planning and Social Science Laboratory

In-Lab TEST - November 21, 2005

Name: \_\_\_\_\_ UserID: \_\_\_\_\_

QUESTION I-1:

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Which municipality had the largest drop in population between 1980 and  
1990: town name = \_\_\_\_\_

What is the population change for this municipality: \_\_\_\_\_

Which shopping center of type propertySU='Neighborhood Center' has the  
largest square footage? PropertyID=\_\_\_\_\_

What is the square footage of that shopping center?  
SquareFeet=\_\_\_\_\_

There are only 351 cities and towns (i.e., municipalities) in Mass, but  
there are 631 polygons in the matown00 shapefile because of islands,  
towns split by rivers, etc. How many municipalities are represented by  
a single polygon in the matown00 shapefile? \_\_\_\_\_

Which municipality is represented by the largest number of distinct  
polygons in matown00? town name=\_\_\_\_\_

How many polygons are used to represent that municipality? Number of  
polygons= \_\_\_\_\_

QUESTION I-2:

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Among those municipalities that contain at least one major highway exit,  
which one has the smallest 1990 population? Town name =\_\_\_\_\_

What is the 1990 population of that municipality? pop90=\_\_\_\_\_

Next, we would like to count the number of major highway exits in each  
municipality. One way to get started with this calculation is to tag  
each row of the exits\_pt attribute table with the name of the  
municipality that it falls within. Explain briefly the steps that you  
would take to do this using ArcGIS.

QUESTION I-2: (continued)

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Carry out these steps in order to determine the number of highway exits within each municipality. Boston contains the largest number of exits (19). Determine the municipality with the second largest number of major highway exits? town\_name = \_\_\_\_\_

What is the number of major highway exits that fall within that municipality? Number of exits = \_\_\_\_\_

QUESTION II-1:

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Part II-1A (4 points): How many municipalities have a population density (pop02/sqmi) of at least 500 people per square mile? Number of towns with pop02 / sqmi > 500 \_\_\_\_\_

Part II-1B (16 points): Develop a thematic map showing the population per square mile (using the pop02 and sqmi fields from the madoreqv.dbf table). Turn in a PDF.

Part II-1C (5 points): Do the towns containing major highway exits tend to be higher density towns?

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How many of the 428 major highway exits fall within municipalities that have a population density of at least 500 persons per square mile?  
Count= \_\_\_\_\_

Part II-1D (3 points): Explain briefly the pluses and minuses of using equal interval vs. quantile classification to visualize the spatial distribution of population density across Massachusetts.

QUESTION II-2:

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Part II-2A (3 points): Comment briefly on any pattern that is suggested by this scatterplot.

Do large municipalities tend to have high road mileage?

What other factors may be at work?

QUESTION II-2: (continued)

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Part II-2C (8 points): Prepare and turn in a new chart showing a scattergram that compares road mileage with population density (as measured by pop02/sqmi). Comment briefly on any pattern that is suggested by this scatterplot.

QUESTION II-3:

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Part II-3A (8 points): Determine the distance from each of the shopping centers in the shopcntrs shapefile to the closest highway exit. Summarize the results by generating a table... Turn in a printout of this table.

Part II-3B (4 points each): What is the furthest distance from a highway exit for any of the 'Neighborhood Center' shopping centers?  
Distance = \_\_\_\_\_

Explain briefly which types of shopping centers tend to be closer to (or further from) the major highway exits?

QUESTION II-4:

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Part II-3A (6 points): Find the grid cell that is furthest from any major highway exit. What is the distance from that grid cell to the closest exit? Distance = \_\_\_\_\_.

Part II-3B (2 points each): What town contains this grid cell? Town Name = \_\_\_\_\_