

# Quiz

## CSC222 Geographic Information Systems

03 November 2014

1. ASCII is the “American Standard Code for Information Interchange.” It is a fifty year old system for representing letters, digits, punctuation, and other characters with numbers. In the beginning, ASCII contained codes only for letters of the English alphabet. Later variations included codes for letters in other languages, but the system did not permit enough codes to represent symbols in a large number of languages or even all of the symbols in some individual Asian languages. Although it has been superceded by Unicode, a system for representating symbols with which many of the world’s languages are written, we still see references to ASCII.

Sometimes the word “ASCII” is used to mean that data has been encoded in a format that can easily be read by human beings. This is in contrast to binary encodings that cannot be directly read through, for example, a text editor.

One of the data files that we used in the laboratory was an ASCII file. Which?

2. The International Date Line is crooked.
  - (a) Why?
  - (b) Read the article about the International Date Line on Wikipedia. How does the position and shape of the line figure in the history of the Philippines and Alaska?
3. The Arctic Circle lies approximately twenty-three and a half degrees south of the North Pole. The Antarctic Circle is the same distance north of the South Pole. The Tropic of Cancer is the same distance north of the equator. The Tropic of Capricorn is the same distance south of the equator.
  - (a) What phenomenon occurs within the region that is bounded by the Arctic Circle and contains the North Pole? The same thing happens in the region that is bounded by the Antarctic Circle and contains the South Pole.
  - (b) What phenomenon occurs within the region bounded by the Tropic of Cancer and the Tropic of Capricorn and contains the equator?

- (c) Why does the same number appear in the definition of the four circles?
4. Find the definition of “developable surface” on Wikipedia or [mathworld.com](http://mathworld.com). How is the concept relevant to our study?
5. Computer scientists have found it convenient to encode all kinds of data (words, photographic images, graphs and drawn images, video recordings, numerical data, audio recordings, and, of course, maps) as binary numbers. You need only a memory of the place value arithmetic that you learned in grade school to understand binary numbers.
- In the familiar decimal (base 10) system, each digit in a number represents a multiple of a power of ten.

$$\begin{aligned} 2014 &= 2 \cdot 10^3 + 0 \cdot 10^2 + 1 \cdot 10^1 + 4 \cdot 10^0 \\ &= (2 \cdot 1000) + (0 \cdot 100) + (1 \cdot 10) + (4 \cdot 1) \end{aligned}$$

In the binary (base 2) system, each digit in a number represents a multiple of a power of two.

$$\begin{aligned} 11111011110_2 &= (1 \cdot 2^{10}) + (1 \cdot 2^9) + (1 \cdot 2^8) + (1 \cdot 2^7) + (1 \cdot 2^6) + (0 \cdot 2^5) + \\ &\quad (1 \cdot 2^4) + (1 \cdot 2^3) + (1 \cdot 2^2) + (1 \cdot 2^0) \\ &= 1024 + 512 + 256 + 128 + 64 + 0 + 16 + 8 + 4 + 2 + 0 \\ &= 2014_{10} \end{aligned}$$

Express  $1010_2$  as a decimal number.

6. Here are names of places that you might find in books published in the English language in the twentieth century. By what names do speakers of English now refer to these places?

**Bombay**

**British Honduras**

**Burma**

**Calcutta**

**Ceylon**

**Danzig**

**Kristiania**

**Leningrad**

**Madras**

**Nanking**

**Peking**

**Port Arthur (Ontario)**

**Stalingrad**

**Szechwan**

**The Ukraine**

7. Some place names are controversial. By what other names are these places known?

**Mount McKinley**

**Persian Gulf**

**Sea of Japan**

8. What is NAD27? Read the Wikipedia article on the subject. Why is NAD27 still important?
9. Johann Heinrich Lambert was a Swiss mathematician of the eighteenth century. What do the other words in “Lambert azimuthal equal-area projection” signify?
10. (a) A satellite that carries a radar altimeter has measured the height of the land at equally spaced points in a region. Would you expect to find these measurements available as raster data or vector data?
- (b) Would you expect a telephone company to represent descriptions of the locations and routes of its fiber optic cables with raster data or vector data?
11. Let us suppose that you have a map that shows the locations of the members of the Associated Colleges of the Midwest. You want to select those colleges that are in Iowa.

Should you construct your query using the word “AND” or “OR?”

Which of these alternatives will you choose?

- $NAME = 'Coe College' \text{ OR } NAME = 'Cornell College' \text{ OR } NAME = 'Luther College' \text{ OR } NAME = 'Grinell College'$
- $NAME = 'Coe College' \text{ AND } NAME = 'Cornell College' \text{ AND } NAME = 'Luther College' \text{ AND } NAME = 'Grinell College'$

12. Geographic Information Systems join the technology of computer graphics with that of database management systems. We are using a *relational database*. Relational databases store data in tables. Rows contain “records” and columns contain “attributes.”

Suppose that your database has a table that holds information about hospitals in California.

- (a) Would you expect to find all of the information about a particular hospital in a row or in a column?
- (b) Would you expect to find the names of all hospitals in the state in a row or in a column?