

INFO-C 307: Week #1

Laboratory Session #1

Problem 1) Approximately 5000 years ago, the ancient Persians used a language called MIKHIOF¹. The character set for this language is captured in UNICODE and can be found on the UNICODE webs site.

<http://www.unicode.org/charts/PDF/U103A0.pdf>

If the Persians had invented an electronic computer like the ones used today with a target language of (0 and 1). How many bits would be needed to represent the entire MIKHI character set as described in the above web site.

Step 1: Review the site <http://www.unicode.org/charts/PDF/U103A0.pdf> to identify exactly how many characters/symbols must be accommodated?

Let **Y** be that number

Step 2: Use the formula provide in our lecture notes to determine the number of bits needed.

Calculate the smallest x, such that:

$$2^x \geq \mathbf{Y}$$

¹“Farsi language that Iranians speak today is based on “Mikhi Language” immortalized by cuneiforms and pictographs left on clay and stone. The history of Farsi goes back to over 3000 B.C., and the languages of Medes, Sakkas, Sumerians and Zarathustra’s Avesta gradually helped to shape this language.” <http://www.rozanehmagazine.com/NoveDec05/aSShirazi.html> For sample text or further explanations see : http://www.cais-soas.com/CAIS/Languages/aryan/aryan_language.htm

Problem 2) Assuming six bits are used to represent numbers in a given computer. Using 2's complement notation, construct a table showing all the positive and negative numbers. (See Unit 1 Part D)

[illegible]

Assignment #1

Problem 1) Review Lab 1, then assume that the Persians had invented an electronic computer with a target language of (0,1,2). How many digits in the target language would be needed to represent the MIKHI character set (<http://www.unicode.org/charts/PDF/U103A0.pdf>) as described in the UNICODE web site.

Problem 2) Using a six bit the number representation (created in lab 1 problem 2), add the following numbers using 2's complement representation. **Show your work.**

- $19 + 17$
- $12 + 12 + (-13)$
- $29 + (-8)$
- $134 + (-100)$
- $-44 + (-34)$

Problem 3) You are asked to design build a high resolution, and high definition digital camera with panoramic capability. You have decided that your camera should allow 12,800 x 2700 resolution. In addition, you have decided that your camera should accommodate up to a 900,000 distinct colors. Assuming, you don't have a method of compressing the images, how much memory is needed to store a picture taken by this camera?

Problem 4) Pick the most complicated program that you have been asked to write in your INFO-C 211 (or INFO-I211) class, document it fully and explain why you consider it to be "complicated" (if your program is in C++, convert it to Java). Show the execution of your program that demonstrates its correctness. Also show screen shot of your IDE (NetBeans, Eclipse, etc.)

What to hand in?

- Source Code (Fully Document each function)
- Explain why you consider the program to be complicated? (Syntax, logic, etc?)
- Execution of the program with appropriate test data? (indicated how your test data is properly testing the functionality of your code)