

In lecture 7 we finished the material on lexicographic order, and Russel's Paradox.

In honor of Labor Day, there is just one problem.

1. Let $A = \{a, b, c, d, e\}$, $B = \{a, c, e, g, i\}$, and $C = \{d, e, f, g, h, i\}$. In this exercise, order the elements of the cartesian products lexicographically, using the alphabetical order on the individual sets. (We are always counting from 0.)
 - a) Show that (e, e, e) is the 112'th element (ordinal 112) of $A \times B \times B$.
 - b) What is the ordinal of (e, e, e) in $A \times B \times A$.
 - c) What is the ordinal of (e, e, e) in $B \times A \times B$.
 - d) What is the ordinal of (e, e, e) in $A \times B \times C$.
 - e) What is the ordinal of (e, e, e) in $C \times B \times A$.
 - f) What is the ordinal of (e, e, e) in $C \times B \times C$.
 - g) What is the 100'th element in $A \times A \times A$.
 - h) What is the 100'th element in $B \times B \times B$.
 - i) What is the 100'th element in $C \times C \times C$.
 - j) What is the 100'th element in $A \times B \times C$.
 - k) What is the 100'th element in $C \times B \times A$.

Don't bother this problem

Bat Masterson was playing poker with Doc Holliday and Wyatt Earp, and Masterson was complaining that his five cards were very bad..

Masterson said he had no aces and, in fact, no face-cards. "You might have 3 or 4 of a kind" said Earp. But Masterson said he didn't even have one lousy pair. "You might have a flush", Doc said, "that's a great hand", but Masterson shook his head and complained that, in fact, he had at least one of every suit. "But you could still have a straight", said Earp, but Masterson shook his head and said that he didn't even have two consecutive values, he just had five lousy mixed-up cards with the hearts adding to 14, the black cards adding to 10, the odd and even values with equal total, and his lowest card was his only spade. "I bet that's impossible", scoffed Earp. "It couldn't be that rotten". "Oh, I don't know about that", said Doc, "I bet there are plenty of hands like that".

"You both bet wrong", said Masterson, "and I bet there is exactly one hand such as I describe, and I have it".

Did Bat Masterson win his bet?