Equivalent or not?

0 1 2 3 4 5 6 7 8 9

Yesterday, when I was waiting for the bus, I heard some people talking. Here is what they said:

Person A

"I say that 0 2 4 6 and 8 are equivalent to each other and that so are 1 3 5 7 and 9."

Person B

"No. I think 0 3 6 and 9 are equivalent to each other, 1 4 7 are equivalent, and so are 2 5 8."

Person C

"I used to think like you, but then I discovered that 0 4 6 and 9 are equivalent, so are 1 2 3 5 7, and 8 is not equivalent to anything but itself."

I was confused for a while, but when I got home, I realized they were all wrong:
0 4 5 and 9 are equivalent, 1 2 and 6 are, and so are 3 7 and 8.

A. Equivalence Relations on the Set of People in this Room:

Questions:

Are you in the same equivalence class as your neighbors?

Do the equivalence classes have a simple characterization?

How many equivalence classes are there for this relation?

Did you need more data to answer the previous question?

1. S ~ T if the first name of S has the same number of letters as the first name of T.

2. M ~ N if M sits in the same row as N.

3. J ~ K if the year J was born has the same number of digits as the year K was born.

4. U ~ Z if U has the same number of names as Z.

5. X ~ Y if:

"the house number of X" -(minus) "the house number of Y" = 2k.

Here k is some integer. In other words, the difference of the house numbers is an even number.

6. D ~ E if …. find some interesting relations and let us know

B. **For the break** Is it raining outside now? How can you find out? How does this relate to equivalence relations (especially to Relation 5)?

C. Given a partition, what is the equivalence relation?

Using the objects in front of you, find out what persons A, B, C and me were thinking.

What are some other relations you can put on this set of objects?

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