Single out person A. Place all A’s acquaintances in a group and all those A is unacquainted with in another group. There are 5 people that are being placed in groups, so one of the groups must have at least 3 members (by the Generalized pigeon-hole principle).

Suppose the group of acquaintances has 3 or more members. If two of them (say B and C) are also acquainted with each other, then A, B, and C form a set of three mutual acquaintances. Otherwise the 3 or more people in the group of A’s acquaintances are all mutually unacquainted.

On the other hand, suppose the group of people A is unacquainted with contains three or more people. If two of them (again named B and C) are mutually unacquainted, then A, B, and C form a set of three mutually unacquainted people. Otherwise there must be 3 people in the group of those A is unacquainted with who are all mutually acquainted.