

## Exercise 2

### DESIGN A CATTLE MARKET

*Cattle markets (mercati di bestiame) use configurations of gates to sort cattle according to an attribute (breed, gender, age, etc.) or combinations of attributes – for example, to separate Angus males from Chianina males, or Romagnola males from Romagnola females.*

- 1 Form teams of 3 (no more, no less). Each team must then:
- 2 Imagine a cattle market in which:
  - The animals flow along a narrow corridor
  - As they move, they meet a sequence of gates
  - At each gate, a man asks only one question, and the animal can only answer 'Yes' or 'No'
  - If the answer is 'No', the animal continues. If the answer is 'Yes', the gate opens and the animal joins another corridor
  - 6 types of cattle enter the system in arbitrary order:

<b>Am</b> (Angus males)	<b>Cm</b> (Chianina males)	<b>Rm</b> (Romagnola males)
<b>Af</b> (Angus females)	<b>Cf</b> (Chianina females)	<b>Rf</b> (Romagnola females)
  - The animals end in 4 pens (*recinti*):

<b>Am+Af</b>	<b>Cm+Rf</b>	<b>Cf</b>	<b>Rm</b>
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  - The man can only ask the breed (e.g. Are you an Angus?) or the gender (e.g. Are you male?)
- 3 For 10 minutes, draw the flow-and-filter diagram for this system
- 4 For 5 minutes, draw the flow-and-filter diagram for a system if the man can only ask an 'and' question (e.g. Are you an Angus and male?). The question must be binary: the answer at each gate must be either 'Yes' or 'No'
- 5 For 5 minutes, draw the flow-and-filter diagram for a system if the man can only ask an 'or' question (e.g. Are you an Angus or a Chianina?). Again, the question must be binary: the answer at each gate must be either 'Yes' or 'No'
- 6 For 10 minutes, on one or more A3 sheets, draw a picture and/or diagram of these systems
- 7 Write your full names (*nomi e cognomi*) on the display
- 8 Fix the display to the wall (using brown, not transparent, scotch tape!) and be prepared to explain it to everyone.