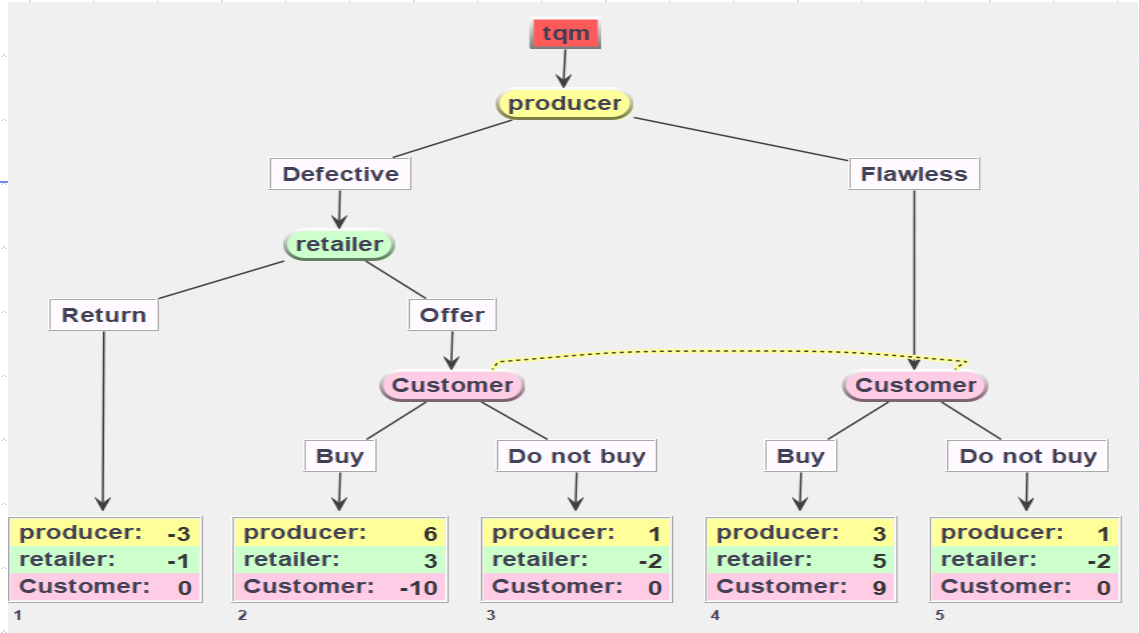
Session 2.3
The Empirical Distribution in Extensive Form Games

This session gives an example of an empirical distribution for a game in extensive form that one of my classes played. The we give a general definition.

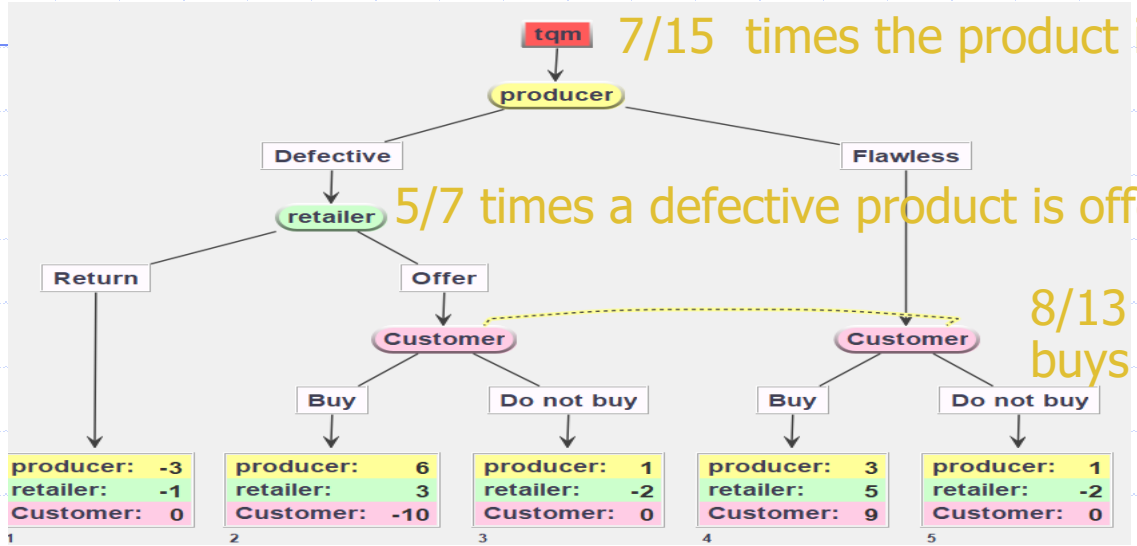
Total quality management



- There are three players:
  - The producer chooses whether to manufacture a flawless or defective product, or more generally the probability of producing a flawless product.
  - Flawless products are always marketed. If a defective product is manufactured, the retailer decides whether to market it or not (or more generally the probability of taking it off the shelf).
  - The consumer decides whether or not to buy the marketed product, but does not know whether it is flawless or defective.

The empirical distribution of TQM

The class starts 16 games.



7/15 times the product is defective.

5/7 times a defective product is offered to the market.

8/13 times the consumer buys the product.

15 of the 16 games started are completed.

- The producer manufactures a defective product in 2 + 4 + 1 = 7 of the 15 completed games.
- The retailer offers a defective product for sale to the consumer in 4 + 1 = 5 of the 7 times that a defective product is manufactured.
- Of the 4 + 1 + 4 + 4 = 13 times the product is marketed, the consumer buys it 4 + 4 = 8 times.

The empirical distribution defined

- The empirical distribution of game play, or more simply, the empirical distribution, can also be defined for the extensive form of a game.
- This definition conforms to the empirical distribution of the strategic form defined last week.
- In the extensive form, the empirical distribution:
  - is defined for each player at every information set by the choice of move.
  - gives the relative frequency, in practice, of the player making any given move at each specific information set.