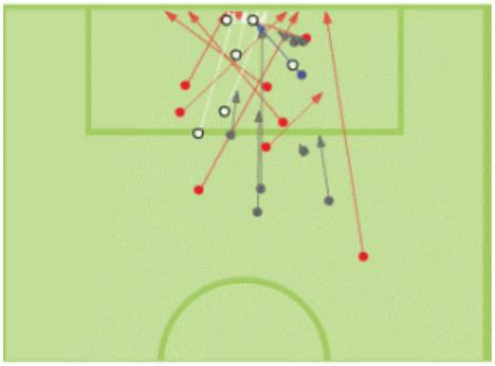
Problem of the Week: Week 3 (Sum2): Year 9: Statistics

- Construct and interpret tables, charts and diagrams
- Describe, interpret and compare measures of central tendency and spread

Charting Success

Below are some graphs, charts and diagrams created by sports statisticians, trainers or competitors to help then to analyse performance, inform training programmes or improve motivation. Choose one or two of these pictures and answer the questions below the picture:

Shots on and off target for one team in a football match



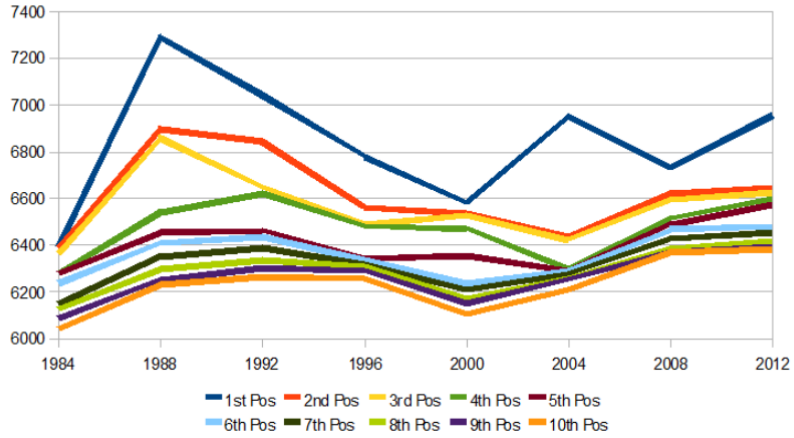
All	22
Goals	6
On target	1
Off target	8
Blocked	7

- How accurate would you say the attacking team was?
- How effective was the defending team in preventing goals?
- If you were attacking, which side of the goal would you aim for?
- How does the chance of scoring a goal change with the distance from the goal?

Solution:

- It appears that the attacking team are not very accurate
- The defending team were moderately effective at stopping goals (roughly the same number of goals as blocked shots.)
- Aim for the left side of the goal as most goals were scored on that side.
- The chance of coring decreases as the distance from the goal increases (defenders have more time to intercept the ball.)

Finishing scores of the top ten athletes in Olympic heptathlon

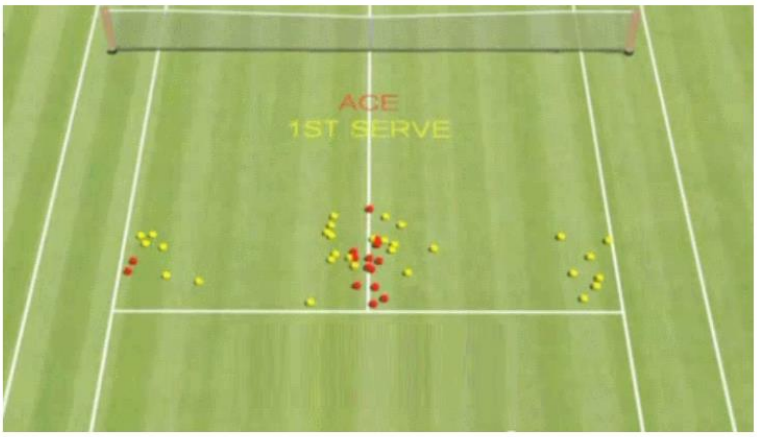


- Which positions tend to be grouped together, and which are spread out?
- Which year had the highest performing winner?
- Which year had the closest competition?
- Imagine you were competing in this event, what score would you need to achieve in order to win a medal?

Solution:

- The 4th to 10th positions tend to be grouped together, whereas 1st to 3rd tend to be quite separate.
- 1988
- 2008
- About 6800

Scatter plot showing Federer's first serve landing points

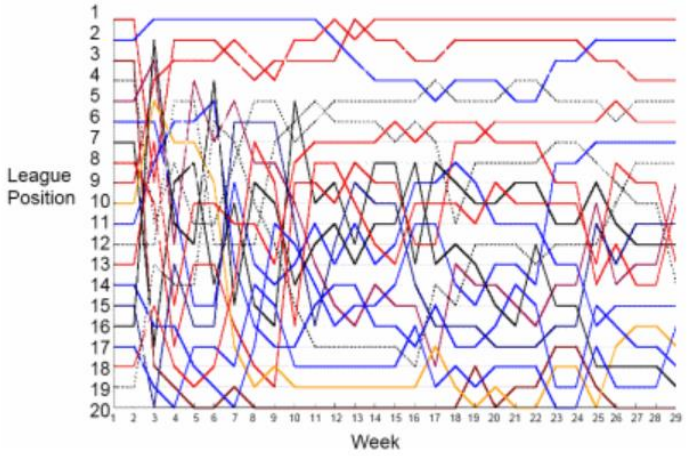


- Where did Federer score the most aces?
- Where would be the best place to stand to return the serve?
- What other information would be useful to have on this plot?
- What is the likelihood that Federer will score and ace?

Solution:

- Federer scored the most aces in the middle, on the right side near the centre.
- Stand a little more than a quarter of the base line from the ends.
- It would help to know where Federer was standing for each serve. The Tennis diagram shows where the ball bounced, you can see that the tennis player did well but it doesn't show the speed the served ball was travelling at. The bounced balls could also be labelled better (e.g make the graph bigger and maybe add a few colours to the bounces that were close to each other). It could also show serves that went out, because we don't know what percentage of serves were out.
- The chance of Federer scoring an ace was 13/43 (or 30.2%)

League positions of teams in a football league during a season



- Why is there so much variance in position early in the league?
- How could this chart be made clearer?
- Which team changed position the most? How could you measure this?
- Which team changed position the least?

Solution:

- At the start teams play each other team regardless of position.
- There is too much information on the graph and so it is not clear. To improve it they could have separated the graph into a top half of the table and the bottom half, or a top six (European places) and bottom three (relegation zone).
- It is tricky to identify - could it be the black line in the middle?
- Again tricky – could it be the yellow or maroon lines at the bottom?

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