## Exercise 1

(a) How many ways to arrange 3 bells? This is the number of 'changes' on 3 bells
(b) Starting from 'rounds' (1 2 3), swap adjacent pairs of bells to obtain all possible changes on 3 bells and then finish with the bells in 'rounds'

| 1 | 2 | 3 |
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(c) Draw a line connecting the positions of bell 1 (the 'treble') in every row
(d) Repeat (c) for any of the other bells
(e) Can you find any other way of swapping the bells to achieve all changes?

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Exercise 2: Plain bob minimus - all the changes on 4 bells

Complete the grid following the rules of the 'place notation' given in column 1.

- x means that pairs of adjacent bells swap
- numbers (e.g.'1' etc) mean that the bell in that position stays in the same position for the next change

|  | $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ |
| :---: | :---: | :---: | :---: | :---: |
| $x$ | 2 | 1 | 4 | 3 |
| $1 x 4$ | 2 | 4 | 1 | 3 |
| $x$ | 4 | 2 | 3 | 1 |
| $1 x 4$ | 4 | 3 | 2 | 1 |
| $x$ | 3 | 4 | 1 | 2 |
| $1 x 4$ | 3 | 1 | 4 | 2 |
| $x$ | 1 | 3 | 2 | 4 |
| $12 x$ | 1 | 3 | 4 | 2 |
| $x$ |  |  |  |  |
| $1 x 4$ |  |  |  |  |
| $x$ |  |  |  |  |
| $1 x 4$ |  |  |  |  |
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| $1 x 4$ |  |  |  |  |
| $x$ |  |  |  |  |
| $12 x$ |  |  |  |  |

Exercise 3: Little Bob Minor - a method on 6 bells

Complete the grid using the place notation given in column 1.

Repeat until the bells are back in rounds

- How many changes to get the bells back in rounds?
- How many changes are possible on 6 bells?

|  | 1 | 2 | 3 | 4 | 5 | 6 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| x | 2 | 1 | 4 | 3 | 6 | 5 |
| 1x6 |  |  |  |  |  |  |
| X |  |  |  |  |  |  |
| 1x4 |  |  |  |  |  |  |
| x |  |  |  |  |  |  |
| $1 \times 6$ |  |  |  |  |  |  |
| X |  |  |  |  |  |  |
| 12x |  |  |  |  |  |  |
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Draw a line connecting the positions of the 'treble' (bell number 1)

Draw a line connecting the positions of bell 2

Chose another bell and draw a line connecting its positions

Exercise 4: Stedman Doubles

|  | 1 | 2 | 3 | 4 | 5 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| x3x | 2 | 1 | 3 | 5 | 4 |
| 1x |  |  |  |  |  |
| x5 |  |  |  |  |  |
| x3x |  |  |  |  |  |
| 1x |  |  |  |  |  |
| x3x |  |  |  |  |  |
| 1x |  |  |  |  |  |
| x3x |  |  |  |  |  |
| x5 |  |  |  |  |  |
| 1x |  |  |  |  |  |
| x3x |  |  |  |  |  |
| 1x |  |  |  |  |  |
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How many changes to get the bells back into rounds?

Draw a line connecting the positions of the 'treble' (bell number 1)

Draw a line connecting the positions of bell 4

Find out more about ringing:
cccbr.org.uk


Chester Guild (includes Wirral):

Liverpool Branch:


