

AN  
INTRODUCTION  
TO  
COMPOSING

John Warboys – July 2020

## Some things to think about

What are the duties of a composer (in the context of bellringing)?

- To produce a touch that starts and ends in rounds
- The touch must be true, i.e. there is no repetition of rows
- The touch must be of sufficient length
- The touch should ideally be musical

Can I be a composer?

- Yes, anyone can be a composer
- You don't need to be an expert ringer
- You don't need to be a mathematician

What skills do I need?

- You should enjoy playing around with numbers; you'll probably need plenty of paper and pens or pencils
- You need to be prepared to spend plenty of time on your own composing
- You need to spend time studying other people's compositions to understand how they work

# Terminology

## Rows

- Change ringing is a continuous process of transposing the positions of adjacent bells, sometimes just one pair at a time, sometimes with several pairs at once
- Each new transposition is a row
- Rows are rung alternately at handstroke and backstroke
- Each row will contain every bell once and only once

## Examples of rows

- 123456
- 654321
- 356412
- 65432187
- 56347812
- 74358162

## A sequence of rows (plain hunt on 4)

- 1234
- 2143
- 2413
- 4231
- 4321
- 3412
- 3142
- 1324
- 1234

# Terminology

## Leads

- A sequence of rows which follow a regular symmetrical pattern
- Each row is derived from the previous row by transposing one or more adjacent pairs of bells
- A specified fixed sequence of rows will usually be called a method

## Plain Bob Minimus

1234	Lead head
2143	
2413	
4231	
4321	
3412	
3142	
<u>1324</u>	Lead end
1342	Lead head

## Plain Bob Minor

135264	Lead head
312546	
321456	
234165	
243615	
426351	
462531	
645213	
654123	
561432	
516342	
<u>153624</u>	Lead end
156342	Lead head

# Terminology

## Courses

- A sequence or group of leads rung one after the other, starting from one row and finishing with the same row; the number of leads in a course will be the number of “working” bells for that particular method, e.g. 5 for Plain Bob Minor
- The ‘plain’ course always starts from rounds
- Other courses will start from different rows but they will always start at the beginning of a lead (at a lead-head) and will return to the same row they started from

### Plain Bob Minor – Plain Course

<u>Lead head</u>	<u>Lead end</u>
123456 (Course head)	132546
135264	153624
156342	165432
164523	146253
142635	124365 (Course end)
123456 (Course head)	

### Plain Bob Minor – Course starting from 154326

<u>Lead head</u>	<u>Lead end</u>
154326 (Course head)	145236
142563	124653
126435	162345
163254	136524
135642	153462 (Course end)
154326 (Course head)	

# Terminology

## Truth, Extents and Proof

- A touch is said to be “true” if all the rows in the touch are different/unique. The maximum number of different rows on any number of bells can be calculated as follows (referred to as the ‘extent’):

$$3 \text{ bells} = 3 \times 2 \times 1 = 6$$

$$5 \text{ bells} = 5 \times 4 \times 3 \times 2 \times 1 = 120$$

$$7 \text{ bells} = 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 5040$$

$$4 \text{ bells} = 4 \times 3 \times 2 \times 1 = 24$$

$$6 \text{ bells} = 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 720$$

$$8 \text{ bells} = 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 40320$$

- For touches which are shorter than the maximum possible, some of the rows will be omitted - but the ones that you do ring must all be different
- If any rows are repeated, the touch is “false” (it only needs one repeated row for the touch to be false)
- For a practice night or Sunday Service touch it doesn’t really matter if the touch you ring is false, although you might just see some people raise their eyebrows if they’ve spotted it. If you had the “Queens” row twice (e.g. 13572468 on eight bells) then this is quite a recognisable row.
- For a quarter peal or a peal, the touch must be true
- The process by which we check whether a touch is true or false is called “Proof” or “Proving” - there are techniques we can use which means we don’t have to manually check every row

# Terminology

## Minor Diversion - Truth on 6 bells or less

- How it is acceptable to ring quarter peal and peal lengths on six bells or less, surely the touch will be false?
- For touches on 6 bells or less, the touch is said to be true if each different row occurs the same number of times in the touch overall. For Doubles you can ring 42 instances of 120 (= 5040), for Minor you can ring 7 instances of 720 (= 5040).
- You can also omit some rows from one of the instances in order to achieve a shorter touch, i.e. the number of occurrences of some of the rows can be one less than the other rows
- E.g. for a quarter peal of Plain Bob Doubles you can ring 10 true touches of 120, and then add a shorter true touch of 60 to get a quarter peal length of 1260 rows. Some rows are rung 10 times, the ones you rang in the touch of 60 at the end have been rung 11 times.
- You cannot ring 10 true touches of 120 followed by two plain courses (40 rows each) to get a quarter peal length of 1280 rows. Some rows will have been rung 12 times (e.g. rounds), other rows will only have been rung 10 times. This touch would be classified as “false”.
- You can ring multi-extent touches which don't have to be made up of consecutive true extents. For a touch of 240 Doubles you can either ring 2 true 120s consecutively, or you can ring any touch in which each of the 120 rows occurs twice. E.g. rounds may not appear at all in the first 120 rows of the touch, but it appears twice in the second 120 rows of the touch.

## The Nature of Rows

All rows are positive or negative

- Rounds is always positive
- Other rows are positive or negative depending on how many swaps of pairs of bells are required to convert the row back to rounds (you are not confined to swapping adjacent pairs of bells)
- If the number of swaps is even (or zero), the row is positive. If the number of swaps is odd, the row is negative. Half of all the possible rows are positive, the other half are all negative.

Row	Swaps	Number of swaps	Nature
12345	None	0	Positive
12435	4 and 3 > 12345	1	Negative
21543	2 and 1 > 12543; 5 and 3 > 12345	2	Positive
45132	4 and 1 > 15432; 5 and 2 > 12435; 4 and 3 > 12345	3	Negative
653421	6 and 1 > 153426; 5 and 2 > 123456	2	Positive
234561	6 and 1 > 234516; 5 and 1 > 234156; 4 and 1 > 231456; 3 and 1 > 213456; 2 and 1 > 123456	5	Negative



## The Nature of Rows

### Plain Hunt on 4

Row Number		Row	Swaps from preceding row	Total swaps from rounds	Nature
1	Lead head	1 2 3 4		0	+
2		2 1 4 3	2	2	+
3		2 4 1 3	1	3	-
4		4 2 3 1	2	5	-
5		4 3 2 1	1	6	+
6		3 4 1 2	2	8	+
7		3 1 4 2	1	9	-
8	Lead end	1 3 2 4	2	11	-
1	Lead head	1 2 3 4	1	12	+

You don't need to keep a tally of the "Total swaps from rounds", you can instead determine the nature of a row based on the nature of the previous row and how many swaps we have made to get the new row.

## The Nature of Rows

Plain Bob Minimus – first lead

Row Number		Row	Nature	Key
1	Lead head	1 2 3 4	+	1+
2		2 1 4 3	+	2+
3		2 4 1 3	-	3-
4		4 2 3 1	-	4-
5		4 3 2 1	+	4+
6		3 4 1 2	+	3+
7		3 1 4 2	-	2-
8	Lead end	1 3 2 4	-	1-
9	Lead head	1 3 4 2	+	1+

1+	2+	3-	4-	4+	3+	2-	1-
1234	2143	2413	4231	4321	3412	3142	1324
1342	3124	3214	2341	2431	4213	4123	1432
1423	4132	4312	3421	3241	2314	2134	1243

# The Nature of Rows

Plain Bob Minimus (whole course)

	Row Number	Row	Nature	Row Number	Row	Nature	Row Number	Row	Nature	Key
Lead head	1	1 2 3 4	+	9	1 3 4 2	+	17	1 4 2 3	+	1+
	2	2 1 4 3	+	10	3 1 2 4	+	18	4 1 3 2	+	2+
	3	2 4 1 3	-	11	3 2 1 4	-	19	4 3 1 2	-	3-
	4	4 2 3 1	-	12	2 3 4 1	-	20	3 4 2 1	-	4-
	5	4 3 2 1	+	13	2 4 3 1	+	21	3 2 4 1	+	4+
	6	3 4 1 2	+	14	4 2 1 3	+	22	2 3 1 4	+	3+
	7	3 1 4 2	-	15	4 1 2 3	-	23	2 1 3 4	-	2-
Lead end	8	1 3 2 4	-	16	1 4 3 2	-	24	1 2 4 3	-	1-

1+	2+	3-	4-	4+	3+	2-	1-
1234	2143	2413	4231	4321	3412	3142	1324
1342	3124	3214	2341	2431	4213	4123	1432
1423	4132	4312	3421	3241	2314	2134	1243

If you have a set of rows which all have unique keys, then if you start that set of rows from a different value for the initial key you will never get any duplicated rows.

# Plain Bob Doubles

## Plain Course

	Row No.	Row		Key	Row No.	Row		Key	Row No.	Row		Key	Row No.	Row		Key
Lead head	1	12345	+	1+	11	13524	-	1-	21	15432	+	1+	31	14253	-	1-
	2	21435	+	2+	12	31254	-	2-	22	51342	+	2+	32	41523	-	2-
	3	24153	+	3+	13	32145	-	3-	23	53124	+	3+	33	45132	-	3-
	4	42513	+	4+	14	23415	-	4-	24	35214	+	4+	34	54312	-	4-
	5	45231	+	5+	15	24351	-	5-	25	32541	+	5+	35	53421	-	5-
	6	54321	+	5+	16	42531	-	5-	26	23451	+	5+	36	35241	-	5-
	7	53412	+	4+	17	45213	-	4-	27	24315	+	4+	37	32514	-	4-
	8	35142	+	3+	18	54123	-	3-	28	42135	+	3+	38	23154	-	3-
	9	31524	+	2+	19	51432	-	2-	29	41253	+	2+	39	21345	-	2-
Lead end	10	13254	+	1+	20	15342	-	1-	30	14523	+	1+	40	12435	-	1-

# Plain Bob Doubles

## Plain Course

	Row No.	Row		Key	Row No.	Row		Key	Row No.	Row		Key	Row No.	Row		Key
Lead head	1	12345	+	15+	11	13524	-	13-	21	15432	+	12+	31	14253	-	14-
	2	21435	+	25+	12	31254	-	24-	22	51342	+	21+	32	41523	-	23-
	3	24153	+	34+	13	32145	-	35-	23	53124	+	31+	33	45132	-	32-
	4	42513	+	43+	14	23415	-	45-	24	35214	+	42+	34	54312	-	41-
	5	45231	+	52+	15	24351	-	54-	25	32541	+	53+	35	53421	-	51-
	6	54321	+	51+	16	42531	-	53-	26	23451	+	54+	36	35241	-	52-
	7	53412	+	41+	17	45213	-	42-	27	24315	+	45+	37	32514	-	43-
	8	35142	+	32+	18	54123	-	31-	28	42135	+	35+	38	23154	-	34-
	9	31524	+	23+	19	51432	-	21-	29	41253	+	24+	39	21345	-	25-
Lead end	10	13254	+	14+	20	15342	-	12-	30	14523	+	13+	40	12435	-	15-

15+	14+	13-	12-	12+	13+	14-	15-
12345	13254	13524	15342	15432	14523	14253	12435
14235	12453	12543	15234	15324	13542	13452	14325
13425	14352	14532	15423	15243	12534	12354	13245

# Plain Bob Minor

## Plain Course

	Row No.	Row		Key	Row No.	Row		Key	Row No.	Row		Key	Row No.	Row		Key	Row No.	Row		Key
Lead head	1	123456	+	156+	13	135264	+	135+	25	156342	+	123+	37	164523	+	142+	49	142635	+	164+
	2	214365	-	265-	14	312546	-	246-	26	513624	-	214-	38	615432	-	231-	50	416253	-	253-
	3	241635	-	364-	15	321456	-	356-	27	531264	-	315-	39	651342	-	321-	51	461523	-	342-
	4	426153	+	453+	16	234165	+	465+	28	352146	+	426+	40	563124	+	412+	52	645132	+	431+
	5	462513	+	542+	17	243615	+	564+	29	325416	+	536+	41	536214	+	513+	53	654312	+	521+
	6	645231	-	631-	18	426351	-	653-	30	234561	-	645-	42	352641	-	624-	54	563421	-	612-
	7	654321	-	621-	19	462531	-	642-	31	243651	-	654-	43	325461	-	635-	55	536241	-	613-
	8	563412	+	512+	20	645213	+	531+	32	426315	+	563+	44	234516	+	546+	56	352614	+	524+
	9	536142	+	413+	21	654123	+	421+	33	462135	+	462+	45	243156	+	456+	57	325164	+	435+
	10	351624	-	324-	22	561432	-	312-	34	641253	-	351-	46	421365	-	365-	58	231546	-	346-
	11	315264	-	235-	23	516342	-	213-	35	614523	-	241-	47	412635	-	264-	59	213456	-	256-
Lead end	12	132546	+	146+	24	153624	+	124+	36	165432	+	132+	48	146253	+	153+	60	124365	+	165+

156+	146+	135+	124+	123+	132+	142+	153+	164+	165+
123456	132546	135264	153624	156342	165432	164523	146253	142635	124365
142356	124536	125463	152643	156234	165324	163542	136452	134625	143265
134256	143526	145362	154632	156423	165243	162534	126354	123645	132465

# Plain Bob Minor

## Course 124356

	Row No.	Row		Key	Row No.	Row		Key	Row No.	Row		Key	Row No.	Row		Key	Row No.	Row		Key
Lead head	1	124356	-	156-	13	145263	-	135-	25	156432	-	123-	37	163524	-	142-	49	132645	-	164-
	2	213465	+	265+	14	412536	+	246+	26	514623	+	214+	38	615342	+	231+	50	316254	+	253+
	3	231645	+	364+	15	421356	+	356+	27	541263	+	315+	39	651432	+	321+	51	361524	+	342+
	4	326154	-	453-	16	243165	-	465-	28	452136	-	426-	40	564123	-	412-	52	635142	-	431-
	5	362514	-	542-	17	234615	-	564-	29	425316	-	536-	41	546213	-	513-	53	653412	-	521-
	6	635241	+	631+	18	326451	+	653+	30	243561	+	645+	42	452631	+	624+	54	564321	+	612+
	7	653421	+	621+	19	362541	+	642+	31	234651	+	654+	43	425361	+	635+	55	546231	+	613+
	8	564312	-	512-	20	635214	-	531-	32	326415	-	563-	44	243516	-	546-	56	452613	-	524-
	9	546132	-	413-	21	653124	-	421-	33	362145	-	462-	45	234156	-	456-	57	425163	-	435-
	10	451623	+	324+	22	561342	+	312+	34	631254	+	351+	46	321465	+	365+	58	241536	+	346+
	11	415263	+	235+	23	516432	+	213+	35	613524	+	241+	47	312645	+	264+	59	214356	+	256+
Lead end	12	142536	-	146-	24	154623	-	124-	36	165342	-	132-	48	136254	-	153-	60	123465	-	165-

156-	146-	135-	124-	123-	132-	142-	153-	164-	165-
124356	142536	145263	154623	156432	165342	163524	136254	132645	123465
132456	123546	125364	152634	156243	165423	164532	146352	143625	134265
143256	134526	135462	153642	156324	165234	162543	126453	124635	142365

## Plain Bob Minor

156+	146+	135+	124+	123+	132+	142+	153+	164+	165+
123456	132546	135264	153624	156342	165432	164523	146253	142635	124365
142356	124536	125463	152643	156234	165324	163542	136452	134625	143265
134256	143526	145362	154632	156423	165243	162534	126354	123645	132465

156-	146-	135-	124-	123-	132-	142-	153-	164-	165-
124356	142536	145263	154623	156432	165342	163524	136254	132645	123465
132456	123546	125364	152634	156243	165423	164532	146352	143625	134265
143256	134526	135462	153642	156324	165234	162543	126453	124635	142365

123+	✓	124+	✓	125+		126+		123-	✓	124-	✓	125-		126-	
132+	✓	134+		135+	✓	136+		132-	✓	134-		135-	✓	136-	
142+	✓	143+		145+		146+	✓	142-	✓	143-		145-		146-	✓
152+		153+	✓	154+		156+	✓	152-		153-	✓	154-		156-	✓
162+		163+		164+	✓	165+	✓	162-		163-		164-	✓	165-	✓



# Plain Bob Minor

## Course 154326

	Row No.	Row		Key	Row No.	Row		Key	Row No.	Row		Key	Row No.	Row		Key	Row No.	Row		Key
Lead head	1	154326	+	126+	13	142563	+	145+	25	126435	+	163+	37	163254	+	152+	49	135642	+	134+
	2	513462	-	215-	14	415236	-	236-	26	214653	-	254-	38	612345	-	261-	50	316524	-	243-
	3	531642	-	314-	15	451326	-	326-	27	241563	-	345-	39	621435	-	361-	51	361254	-	352-
	4	356124	+	423+	16	543162	+	415+	28	425136	+	436+	40	264153	+	452+	52	632145	+	461+
	5	365214	+	532+	17	534612	+	514+	29	452316	+	526+	41	246513	+	543+	53	623415	+	561+
	6	632541	-	641-	18	356421	-	623-	30	543261	-	615-	42	425631	-	634-	54	264351	-	652-
	7	623451	-	651-	19	365241	-	632-	31	534621	-	614-	43	452361	-	625-	55	246531	-	643-
	8	264315	+	562+	20	632514	+	541+	32	356412	+	523+	44	543216	+	516+	56	425613	+	534+
	9	246135	+	463+	21	623154	+	451+	33	365142	+	432+	45	534126	+	416+	57	452163	+	425+
	10	421653	-	354-	22	261345	-	362-	34	631524	-	341-	46	351462	-	325-	58	541236	-	316-
	11	412563	-	245-	23	216435	-	263-	35	613254	-	251-	47	315642	-	234-	59	514326	-	216-
Lead end	12	145236	+	136+	24	124653	+	154+	36	162345	+	162+	48	136524	+	143+	60	153462	+	125+

126+	136+	145+	154+	163+	162+	152+	143+	134+	125+
154326	145236	142563	124653	126435	162345	163254	136524	135642	153462
153246	135426	134562	143652	146325	164235	162453	126543	125634	152364
152436	125346	123564	132654	136245	163425	164352	146532	145623	154263

# Plain Bob Minor

## Course 153426

	Row No.	Row		Key	Row No.	Row		Key	Row No.	Row		Key	Row No.	Row		Key	Row No.	Row		Key
Lead head	1	153426	-	126-	13	132564	-	145-	25	126345	-	163-	37	164253	-	152-	49	145632	-	134-
	2	514362	+	215+	14	315246	+	236+	26	213654	+	254+	38	612435	+	261+	50	416523	+	243+
	3	541632	+	314+	15	351426	+	326+	27	231564	+	345+	39	621345	+	361+	51	461253	+	352+
	4	456123	-	423-	16	534162	-	415-	28	325146	-	436-	40	263154	-	452-	52	642135	-	461-
	5	465213	-	532-	17	543612	-	514-	29	352416	-	526-	41	236514	-	543-	53	624315	-	561-
	6	642531	+	641+	18	456321	+	623+	30	534261	+	615+	42	325641	+	634+	54	263451	+	652+
	7	624351	+	651+	19	465231	+	632+	31	543621	+	614+	43	352461	+	625+	55	236541	+	643+
	8	263415	-	562-	20	642513	-	541-	32	456312	-	523-	44	534216	-	516-	56	325614	-	534-
	9	236145	-	463-	21	624153	-	451-	33	465132	-	432-	45	543126	-	416-	57	352164	-	425-
	10	321654	+	354+	22	261435	+	362+	34	641523	+	341+	46	451362	+	325+	58	531246	+	316+
	11	312564	+	245+	23	216345	+	263+	35	614253	+	251+	47	415632	+	234+	59	513426	+	216+
Lead end	12	135246	-	136-	24	123654	-	154-	36	162435	-	162-	48	146523	-	143-	60	154362	-	125-

126-	136-	145-	154-	163-	162-	152-	143-	134-	125-
153426	135246	132564	123654	126345	162435	164253	146523	145632	154362
154236	145326	143562	134652	136425	163245	162354	126534	125643	152463
152346	125436	124563	142653	146235	164325	163452	136542	135624	153264

## Plain Bob Minor

To summarise/recap:

- The maximum number of rows for Plain Bob Minor is 720
- Half the rows are positive, half are negative
- To ring all the rows, we must ring all the rows in each of the following 12 courses:

### In-Course (Positive)

123456

142356

134256

154326

153246

152436

### Out-of-Course (Negative)

124356

132456

143256

153426

154236

152346

Courses are defined as “In Course” when they start from a positive row, and “Out-Of-Course” when they start from a negative row.

$$12 \text{ (rows in a lead)} \times 5 \text{ (leads in a course)} \times 12 \text{ (courses)} = 720$$

## Plain Bob Minor

Course Head	Lead Heads and Lead Ends					Alternative Course Head
23456	23456	35264	56342	64523	42635	32546
	32546	53624	65432	46253	24365	
42356	42356	25463	56234	63542	34625	24536
	24536	52643	65324	36452	43265	
34256	34256	45362	56423	62534	23645	43526
	43526	54632	65243	26354	32465	
24356	24356	45263	56432	63524	32645	42536
	42536	54623	65342	36254	23465	
32456	32456	25364	56243	64532	43625	23546
	23546	52634	65423	46352	34265	
43256	43256	35462	56324	62543	24635	34526
	34526	53642	65234	26453	42365	
54326	54326	42563	26435	63254	35642	45236
	45236	24653	62345	36524	53462	
53246	53246	34562	46325	62453	25634	35426
	35426	43652	64235	26543	52364	
52436	52436	23564	36245	64352	45623	25346
	25346	32654	63425	46532	54263	
53426	53426	32564	26345	64253	45632	35246
	35246	23654	62435	46523	54362	
54236	54236	43562	36425	62354	25643	45326
	45326	34652	63245	26534	52463	
52346	52346	24563	46235	63452	35624	25436
	25436	42653	64325	36542	53264	

Row No.	Row		Key
1	156342	+	123+
2	513624	-	214-
3	531264	-	315-
4	352146	+	426+
5	325416	+	536+
6	234561	-	645-
7	243651	-	654-
8	426315	+	563+
9	462135	+	462+
10	641253	-	351-
11	614523	-	241-
12	165432	+	132+

Lead head

Row No.	Row		Key
12	165432	+	132+
11	614523	-	241-
10	641253	-	351-
9	462135	+	462+
8	426315	+	563+
7	243651	-	654-
6	234561	-	645-
5	325416	+	536+
4	352146	+	426+
3	531264	-	315-
2	513624	-	214-
1	156342	+	123+

Lead end

Any lead can be rung in reverse

# Plain Bob Minor

Course Head	Lead Heads and Lead Ends					Alternative Course Head
23456	<del>23456</del> 32546	<del>35264</del> 53624	56342	64523	<del>42635</del> 24365	32546
42356	42356	25463	56234	63542	34625	24536
34256	34256	45362	56423	62534	23645	43526
24356	<del>24356</del> 42536	45263	56432	63524	<del>32645</del> 23465	42536
32456	32456	25364	56243	64532	43625	23546
43256	43256	35462	56324	62543	24635	34526
54326	54326	<del>42563</del> 24653	26435	63254	<del>35642</del> 53462	45236
53246	53246	34562	46325	62453	25634	35426
52436	52436	23564	36245	64352	45623	25346
53426	<del>53426</del> 35246	<del>32564</del> 23654	26345	64253	45632	35246
54236	54236	43562	36425	62354	25643	45326
52346	52346	24563	46235	63452	35624	25436

## Plain Lead

Lead head 123456  
 Lead end 132546  
 Lead head 135264

## Bob (-)

Lead head 123456  
 Lead end 132546  
 Lead head 123564

## Single (s)

Lead head 123456  
 Lead end 132546  
 Lead head 132564

## 108 Plain Bob Minor

Call	Transposition	Lead Head
		23456
	35264	35264
-	23564	35642
s	32564	53426
	35264	32564
-	23564	32645
	35264	24356
s	32564	42563
-	23564	42635
	35264	23456

## Queens & Tittums

# Plain Bob Minor

Course Head	Lead Heads and Lead Ends					Alternative Course Head
23456	<del>23456</del>	<del>35264</del>	56342	64523	42635	32546
42356	32546	53624	65432	46253	24365	24536
34256	42356	25463	56234	63542	34625	43526
24356	24536	52643	65324	36452	43265	42536
32456	34256	45362	56423	62534	23645	23546
43256	43526	54632	65243	26354	32465	34526
54326	24356	45263	56432	63524	32645	45236
53246	42536	54623	65342	36254	23465	35426
52436	32456	25364	56243	64532	43625	25346
53426	23546	52634	65423	46352	34265	35246
54236	43256	35462	56324	62543	24635	45326
52346	34526	53642	65234	26453	42365	25436
	54326	42563	26435	63254	<del>35642</del>	
	<del>45236</del>	24653	62345	36524	<del>53462</del>	
	<del>53246</del>	34562	<del>46325</del>	<del>62453</del>	<del>25634</del>	
	<del>35426</del>	43652	64235	26543	<del>52364</del>	
	52436	23564	36245	<del>64352</del>	<del>45623</del>	
	25346	32654	63425	46532	<del>54263</del>	
	53426	32564	26345	64253	45632	
	35246	23654	62435	46523	54362	
	54236	43562	36425	62354	25643	
	45326	34652	63245	26534	52463	
	52346	52346	24563	46235	63452	
		25436	42653	64325	36542	
				53264		

## Plain Lead

Lead head 123456  
 Lead end 132546  
 Lead head 135264

## Bob (-)

Lead head 123456  
 Lead end 132546  
 Lead head 123564

## Single (s)

Lead head 123456  
 Lead end 132546  
 Lead head 132564

## 192 Plain Bob Minor

Call	Transposition	Lead Head
		23456
	35264	35264
-	23564	35642
	35264	54326
-	23564	54263
	35264	46532
-	23564	46325
	35264	62453
	35264	25634
	35264	53246
-	23564	53462
	35264	36524
-	23564	36245
	35264	64352
-	23564	64523
	35264	42635
	35264	23456

←

←

FALSE

# Plain Bob Minor

Course Head	Lead Heads and Lead Ends					Alternative Course Head
23456	23456	35264	56342	64523	42635	32546
42356	42356	25463	56234	63542	34625	24536
34256	34256	45362	56423	62534	23645	43526
24356	24356	45263	56432	63524	32645	42536
32456	32456	25364	56243	64532	43625	23546
43256	43256	35462	56324	62543	24635	34526
54326	54326	42563	26435	63254	35642	45236
53246	53246	34562	46325	62453	25634	35426
52436	52436	23564	36245	64352	45623	25346
53426	53426	32564	26345	64253	45632	35246
54236	54236	43562	36425	62354	25643	45326
52346	52346	24563	46235	63452	35624	25436

720 Plain Bob Minor

23456	42356	34256
23564	42563	34562
36245	26435	46325
64352	63254	62453
45623	35642	25634
52436	54326	53246
s 25364	s 45263	s 35462
56243	56432	56324
64532	63524	62543
43625	32645	24635
32456	24356	43256
- 32564	- 24563	- 43562
26345	46235	36425
64253	63452	62354
45632	35624	25643
53426	52346	54236
s 35264	s 25463	s 45362
56342	56234	56423
64523	63542	62534
42635	34625	23645
- 42356	- 34256	- 23456

# Plain Bob Minor

Course Head	Lead Heads and Lead Ends					Alternative Course Head
23456	23456	35264	56342	64523	42635	32546
	32546	53624	65432	46253	24365	
42356	42356	25463	56234	63542	34625	24536
	24536	52643	65324	36452	43265	
34256	34256	45362	56423	62534	23645	43526
	43526	54632	65243	26354	32465	
24356	24356	45263	56432	63524	32645	42536
	42536	54623	65342	36254	23465	
32456	32456	25364	56243	64532	43625	23546
	23546	52634	65423	46352	34265	
43256	43256	35462	56324	62543	24635	34526
	34526	53642	65234	26453	42365	
54326	54326	42563	26435	63254	35642	45236
	45236	24653	62345	36524	53462	
53246	53246	34562	46325	62453	25634	35426
	35426	43652	64235	26543	52364	
52436	52436	23564	36245	64352	45623	25346
	25346	32654	63425	46532	54263	
53426	53426	32564	26345	64253	45632	35246
	35246	23654	62435	46523	54362	
54236	54236	43562	36425	62354	25643	45326
	45326	34652	63245	26534	52463	
52346	52346	24563	46235	63452	35624	25436
	25436	42653	64325	36542	53264	

720 Plain Bob Minor

23456	42356	43256
- 23564	- 42563	- 43562
36245	26435	36425
64352	63254	62354
45623	35642	25643
- 45236	- 35426	- 25436
- 45362	- 35264	- 25364
56423	56342	56243
62534	64523	64532
23645	42635	43625
34256	s 24356	32456
- 34562	- 24563	- 32564
46325	46235	26345
62453	63452	64253
25634	35624	45632
- 25346	- 35246	- 45326
- 25463	- 35462	- 45263
56234	56324	56432
63542	62543	63524
34625	24635	32645
42356	43256	s 23456



# Composition Notation

720 Plain Bob Minor

23456	42356	34256
- 23564	- 42563	- 34562
36245	26435	46325
64352	63254	62453
45623	35642	25634
52436	54326	53246
s 25364	s 45263	s 35462
56243	56432	56324
64532	63524	62543
43625	32645	24635
32456	24356	43256
- 32564	- 24563	- 43562
26345	46235	36425
64253	63452	62354
45632	35624	25643
53426	52346	54236
s 35264	s 25463	s 45362
56342	56234	56423
64523	63542	62534
42635	34625	23645
- 42356	- 34256	- 23456

W	H	23456
-		52436
S		32456
-		53426
S	-	42356
-		54326
S		24356
-		52346
S	-	34256
-		53246
S		43256
-		54236
S	-	23456

W	H	23456
4	-	42356
Repeat twice. 4 = -s-s		

When the tenor is dodging 5-6 up (so it will be in 5ths place at the new lead head), this position is referred to as the “Wrong” position.

When the tenor is dodging 5-6 down (so it will be in 6ths place at the new lead head – which is also the new course head), this position is referred to as the “Home” position.

# Plain Bob Major

## Plain Course (first 4 leads)

	Row No.	Row		Key	Row No.	Row		Key	Row No.	Row		Key	Row No.	Row		Key
Lead head	1	12345678	+	178+	17	13527486	+	157+	33	15738264	+	135+	49	17856342	+	123+
	2	21436587	+	287+	18	31254768	+	268+	34	51372846	+	246+	50	71583624	+	214+
	3	24163857	-	386-	19	32145678	-	378-	35	53127486	-	357-	51	75138264	-	315-
	4	42618375	-	475-	20	23416587	-	487-	36	35214768	-	468-	52	57312846	-	426-
	5	46281735	+	564+	21	24361857	+	586+	37	32541678	+	578+	53	53721486	+	537+
	6	64827153	+	653+	22	42638175	+	675+	38	23456187	+	687+	54	35274168	+	648+
	7	68472513	-	742-	23	46283715	-	764-	39	24365817	-	786-	55	32547618	-	758-
	8	86745231	-	831-	24	64827351	-	853-	40	42638571	-	875-	56	23456781	-	867-
	9	87654321	+	821+	25	68472531	+	842+	41	46283751	+	864+	57	24365871	+	876+
	10	78563412	+	712+	26	86745213	+	731+	42	64827315	+	753+	58	42638517	+	785+
	11	75836142	-	613-	27	87654123	-	621-	43	68472135	-	642-	59	46283157	-	684-
	12	57381624	-	524-	28	78561432	-	512-	44	86741253	-	531-	60	64821375	-	573-
	13	53718264	+	435+	29	75816342	+	413+	45	87614523	+	421+	61	68412735	+	462+
	14	35172846	+	346+	30	57183624	+	324+	46	78165432	+	312+	62	86147253	+	351+
	15	31527486	-	257-	31	51738264	-	235-	47	71856342	-	213-	63	81674523	-	241-
Lead end	16	13254768	-	168-	32	15372846	-	146-	48	17583624	-	124-	64	18765432	-	132-

## Plain Bob Major – Course Heads

How many rows does the group with the key 178+ have?

1	.	.	.	.	.	7	8	+
---	---	---	---	---	---	---	---	---

That gives us 60 “in-course” courses (60 x 112 = 6,720 rows so plenty of scope for a peal length)

If we also use the course heads where the key is 178- (e.g. 12435678), all the keys in this course are different to those in 178+ course, so we can also use these additional 60 “out-of-course” courses (so now 13,440 rows to choose from)

In-course  
course heads


23456	42356	34256
32546	53246	25346
52436	45236	24536
54326	35426	43526
24365	32465	43265
23645	62345	36245
42635	64235	26435
34625	63425	46325
23564	52364	35264
32654	63254	26354
62534	56234	25634
36524	53624	65324
42563	54263	25463
24653	62453	46253
52643	65243	26543
64523	56423	45623
34562	53462	45362
43652	64352	36452
56342	35642	63542
65432	46532	54632

Out-of-course  
course heads

32456	43256	24356
23546	52346	35246
53426	45326	34526
54236	25436	42536
34265	23465	42365
32645	63245	26345
43625	64325	36425
24635	62435	46235
32564	53264	25364
23654	62354	36254
63524	56324	35624
26534	52634	65234
43562	54362	35462
34652	63452	46352
53642	65342	36542
64532	56432	45632
24563	52463	45263
42653	64253	26453
56243	25643	62543
65423	46523	54623

# Plain Bob Major - Calls

How calls move you to a different course

12345678		
13527486	Wrong	
15738264		
17856342		
18674523	Before	
16482735		
14263857	Middle	
12345678	Home	
	Bob	Single
Wrong (7-8 up)	52436	53426
Before (run out)	35264	
Middle (5-6 down)	43652	63452
Home (7-8 down)	42356	24356

240 Plain Bob Major

Position	Call	Transposition	Course Head		
			23456		
Wrong	-	52436	52436		
Middle	-	43652	42635		
Home	-	42356	64235		
Wrong	-	52436	36245		
Before	-	35264	64352		
Middle	s	63452	24356		
Home	s	24356	23456		
	W	B	M	H	23456
	-		-	-	64235
	-	-	s	s	23456

# Plain Bob Major - Proof

In-course  
course heads

23456	42356	34256
32546	53246	25346
52436	45236	24536
54326	35426	43526
24365	32465	43265
23645	62345	36245
42635	64235	26435
34625	63425	46325
23564	52364	35264
32654	63254	26354
62534	56234	25634
36524	53624	65324
42563	54263	25463
24653	62453	46253
52643	65243	26543
64523	56423	45623
34562	53462	45362
43652	64352	36452
56342	35642	63542
65432	46532	54632

W	M	H	23456
-	-	-	64235
		-	26435
-		-	43265
		-	24365
		-	32465
-		-	46325
		-	34625
		-	63425
-		-	42635

Repeat 4 times (part heads 23456, 42635, 64523, 56342, 35264)

W	M	H	23456
-	-	-	64235
-		-	23645
		-	62345
		-	36245
-		-	24365
		-	32465
		-	43265
-		-	26435
		-	42635

Repeat 4 times (part heads 23456, 42635, 64523, 56342, 35264)

W (7)	M (6)	H (8)
52436	42635	64235
64235	64235	26435
32465	32465	43265
43265	43265	24365
24365	24365	32465
63425	63425	46325
46325	46325	34625
34625	34625	63425
26435	26435	42635
34625	64523	56423

← FALSE  
←

W (7)	M (6)	H (8)
52436	42635	64235
36245	36245	23645
23645	23645	62345
62345	62345	36245
43265	43265	24365
24365	24365	32465
32465	32465	43265
64235	64235	26435
26435	26435	42635
34625	64523	56423

TRUE  
5040  
5-part

# Plain Bob Major - Proof

## In-course course heads

23456	42356	34256
32546	53246	25346
52436	45236	24536
54326	35426	43526
24365	32465	43265
23645	62345	36245
42635	64235	26435
34625	63425	46325
23564	52364	35264
32654	63254	26354
62534	56234	25634
36524	53624	65324
42563	54263	25463
24653	62453	46253
52643	65243	26543
64523	56423	45623
34562	53462	45362
43652	64352	36452
56342	35642	63542
65432	46532	54632

W	B	H	23456
-	-	-	23564
-		-	56234
		-	25634
		-	62534
-		-	53624
		-	65324
		-	36524
-		-	52364
		-	35264

Repeat 4 times (part heads 23456, 35264, 56342, 64523, 42635)

W	B	H	23456
	-	-	23564
-		-	52364
		-	36524
		-	53624
		-	65324
-		-	32654
		-	63254
-		-	25634
		-	62534

Repeat 4 times (part heads 23456, 62534, 46325, 54263, 35642)

W (7)	B (3)	H (8)
23456	23456	
	35264	23564
62534	62534	56234
56234	56234	25634
25634	25634	62534
36524	36524	53624
53624	53624	65324
65324	65324	36524
23564	23564	52364
52364	52364	35264
35264	35264	
	56342	35642



FALSE



W (7)	B (3)	H (8)
23456	23456	
	35264	23564
23564	23564	52364
65324	65324	36524
36524	36524	53624
53624	53624	65324
26354	26354	32654
32654	32654	63254
56234	56234	25634
25634	25634	62534
62534	62534	
	23645	62345

TRUE  
5120  
5-part

## Plain Bob Major – Composition Notation

5120 Plain Bob Major

W	B	H	23456
	-	2	52364
-		3	65324
-		2	63254
-		2	62534

5-part



5120 Plain Bob Major

23456	W	B	H
52364		-	2
65324	-		3
63254	-		2
62534	-		2

5-part

5040 Plain Bob Major

W	M	H	23456
-	-	-	64235
-		3	36245
-		3	43265
-		2	42635

5-part

## Close

What do I need to do get started?

- Start with touches of Plain Bob Minor
- Experiment with other plain Minor methods with different lead-end orders (e.g. St Clement's)
- Then try your hand at Plain Bob Major
- Keep things simple to start with
- Study other people's compositions and "work them out"



# PLYMOUTH GENERAL WORKBOOK

---

TOUCHES AND  
COMPOSITIONS

BOOK 1.

NAME \_\_\_\_\_

FORM \_\_\_\_\_

SUBJECT \_\_\_\_\_

①

### PLAIN BOB DOUBLES

<u>120</u>	<u>120</u>	<u>120</u>	<u>120</u>
2345	2345	2345	2345
3524	3524	3524	- 2354
5432	5432	- 3542	3425
4253	- 5423	5234	4532
- 4235	+ 352	2453	5243
Repeat twice	Repeat twice	Repeat twice	Repeat twice

<u>60</u>	<u>60</u>	1 2 3 4 5	<u>100</u>	<u>100</u>
2345	2345		2345	2345
3524	- 2354		- 2354	- 2354
- 3542	3425		3425	3425
Repeat twice	Repeat twice		- 3452	4532
			4285	- 4523

<u>100</u>	<u>100</u>	<u>100</u>	2345	2345
2345	2543	2345	3524	3524
3524	- 3542	3524	5432	5432
- 3542	5234	3524	- 5423	- 5423
5234	2453	3524	4352	4352
- 5243	- 2435	3524	- 4325	- 4325
2354		3524	REPEAT	REPEAT
REPEAT	REPEAT	3524		

• CALLING POSITION + STARTING POSITION

②

### PLAIN BOB MINOR

<u>36</u>	<u>72</u>	<u>72</u>	<u>72, 144</u>
23456	23456	23456	23456
- 23564	- 23564	S 32564	35264
- 23645	- 23645	S 23645	- 35642
- 23456	S 32456	S 32456	54326
	- 32564	S 23564	42563
<u>36</u>	- 32645	S 32645	* - 42635
23456	S 23456	S 23456	23456
S 32564			For 144, call
- 32645	<u>108, 216</u>	<u>144</u>	single at *
S 23456	23456	23456	and repeat
	- 23564	35264	(with single)
<u>120</u>	- 23645	- 35642	<u>72</u>
23456	34256	54326	23456
35264	Repeat twice	+ 2563	35264
56342	For 216, call	- + 2635	56342
64523	single at end	S 2+356	- 56423
42635	and repeat.	Repeat.	Repeat
S 24356	SEE ALSO PAGE 5		

Repeat TO DOUBLE A LENGTH CALL SINGLE AT END AND REPEAT

## Close

Should I use a computer to prove my compositions?

- Yes
- But only after you've satisfied yourself of truth "by hand"
- Useful to confirm touch length
- There is little benefit in just knocking something together without thinking about what you're doing and then just putting it through a proving program and hoping it will be true

What about Grandsire, Stedman, Spliced, "Split Tenors"?

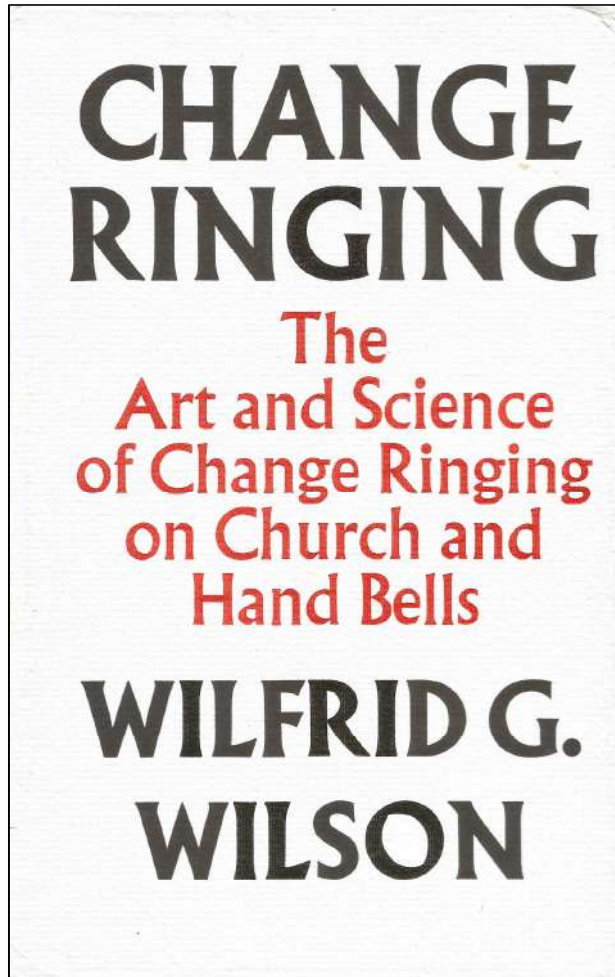
- This presentation has just been an attempt to start you off with the basics
- Once you've got a good grasp of the basics and have practised producing your own compositions then you can start thinking about progressing onto the more complex stuff, the same techniques will still apply

Always start with a plan

- Simple or complex?
- Multi-part or one-part?
- Bobs-only or singles too?
- Any musical considerations?

Close

Are there any good resources I can reference to help me with composing?



*"The best on basic change ringing composition principles - a timeless classic"*

*"This is a classic text which should be in the library of any experienced bell-ringer looking to extend their ability and knowledge"*

# Questions