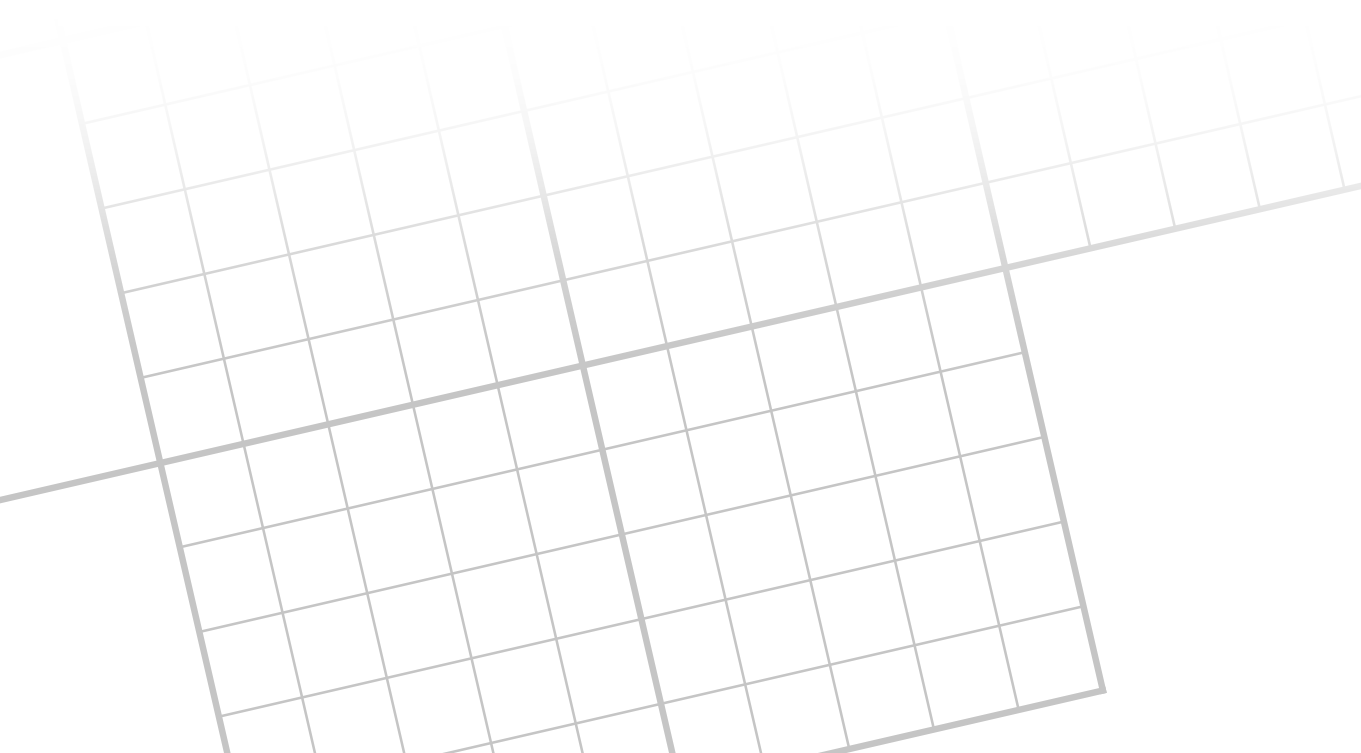


LOGIC

P R O B L E M S

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How to Solve Logic Problems

The introduction sets the scene. Use the chart to record information from the clues. Enter an **X** for a definite 'no' and a **✓** to show a 'yes'. This process will help to narrow down the possibilities and may eliminate alternatives to provide new information. Return to the clues, in the light of any new facts, to uncover more positive/negative relationships.

Example

Three children live in the same street. From the two clues given below, can you discover each child's full name and age?

Clues

- Miss Brown is three years older than Mary.
- The child whose surname is White is 9 years old.

Solution

Miss Brown (clue 1) cannot be Brian. Place an **X** in the Brian/Brown box. She cannot be Mary, so put an **X** in the Mary/Brown box. Miss Brown is therefore Anne. Place a **✓** in that box and an **X** against other possible surnames for Anne.

Anne Brown is three years older than Mary (clue 1). She must be 10 and Mary, 7. Place **✓**s in the Anne/10, Brown/10 and Mary/7 boxes. Place **X**s in the empty boxes in each row and column containing these **✓**s.

The chart now reveals Brian's age as 9. Place a **✓** in the Brian/9 box.

Clue 2 states that White is 9, so he must be Brian. Place a **✓** in the White/9 box and Brian/White boxes and an **X** in each row and column containing these **✓**s.

The unfilled boxes must contain **✓**s, so Green must be the surname of 7-year-old Mary.

	Brown	Green	White	7	9	10
Anne						
Brian						
Mary						
7						
9						
10						

	Brown	Green	White	7	9	10
Anne	✓	X	X	X	X	✓
Brian	X	X	✓	X	✓	X
Mary	X		X	✓	X	X
7	X		X			
9	X	X	✓			
10	✓	X	X			

Morning Fill-up

It's 7.50am and the Peckish Pixie transport café on the main road between Churchminster and Stonekeigh is doing a good trade. One table holds three regular breakfasters who are eagerly filling up before the day's work. Can you say what occupation each of the three follows, and what they are eating and drinking to start the day?

Clues

- 1 The truck driver is tucking into a plate of scrambled eggs; Miriam is a roofer, working for Topps Roofing Contractors.
- 2 The customer who has ordered a bacon sandwich with a large glass of orange juice isn't Larry.
- 3 Kate is slurping a large mug of tea (it's her third but refills are included, so who's counting?) but hasn't ordered the bowl of porridge.

	Carpenter	Roofer	Truck driver	Bacon sandwich	Porridge	Scrambled eggs	Coffee	Orange juice	Tea
Kate									
Larry									
Miriam									
Coffee									
Orange juice									
Tea									
Bacon sandwich									
Porridge									
Scrambled eggs									

Customer	Occupation	Breakfast	Drink

Mid-morning Top-up

The three workers in the puzzle above have finished their breakfast. Just before they leave to start their day's toil they each pick up a little something to perk them up in a few hours' time and to bridge the gap until lunch. Can you say what treat each bought, to where he or she was heading and at what time they pulled out of the Peckish Pixie's car park?

Clues

- 1 'Better get started,' said Kate as the three of them headed for the door, 'I've got to get to Churchminster by 8.45, 'See you tomorrow,' replied Larry as he slipped his mid-morning Danish pastry into his pocket.
- 2 It took Miriam a little longer to get herself sorted out than the person who had bought a flapjack and she followed them out of the car park two minutes later.
- 3 As their satnav timer turned to 8.19am, one of the three pulled out of the car park and headed towards Stonekeigh.

	Danish pastry	Doughnut	Flapjack	Churchminster	Stonekeigh	Wallingfen	8.17	8.19	8.21
Kate									
Larry									
Miriam									
8.17									
8.19									
8.21									
Churchminster									
Stonekeigh									
Wallingfen									

Customer	Treat	Going to	Time

Knights and Clubs

As part of their rehabilitation process after failing their annual errantry certificate, each of the knock-kneed knights of the Round Table was assigned to help at a different squire's club in Camelot, each sponsored by an important personage. One activity particularly favoured by the lads was kicking around an inflated pig's bladder and some were so adept that it was suggested that the clubs might form teams to compete with each other. This ridiculous idea was dismissed as the pointless game would never catch on. Can you match the knights with their clubs, sponsors, and meeting nights?

Clues

- 1 The Wednesday club, so called because it met every Wednesday night, did not have a royal as its sponsor.
- 2 The Palace club's meetings were earlier in the week than those attended by Sir Timid de Shayke, but not on the previous evening.
- 3 Sir Sorely à Frayde was involved with a club which met later in the week than the Athletic.
- 4 Sir Coward de Custarde's club, the Spurs, met the night after the one sponsored by King Arthur himself.
- 5 Queen Guinevere graciously presided over the club which met on Thursdays, which was not attended by Sir Poltroon à Ghaste.
- 6 Sir Spynelless de Feete was assigned to help at the club sponsored by Sir Lancelot.

	Athletic	Palace	Spurs	Villa	Wednesday	King Arthur	Merlin	Queen Guinevere	Sir Galahad	Sir Lancelot	Monday	Tuesday	Wednesday	Thursday	Friday
Sir Coward de Custarde															
Sir Poltroon à Ghaste															
Sir Sorely à Frayde															
Sir Spynelless de Feete															
Sir Timid de Shayke															
Monday															
Tuesday															
Wednesday															
Thursday															
Friday															
King Arthur															
Merlin															
Queen Guinevere															
Sir Galahad															
Sir Lancelot															

- 7 The Villa club, sponsored by Merlin, was named after the latter's luxury country retreat just outside Camelot.

Knight	Club	Sponsor	Night

Waiting Brief

Four top city financiers are celebrating their latest deal with a lavish dinner at the High Vee Restaurant while their drivers wait outside. Can you name the driver of each of these cars, say what luxury make of car they drive, and determine what he or she is doing while they wait? (Lefts and rights are from our point of view.)

Clues

- | | | |
|--|--|---|
| <p>1 Gemma Ford is the driver of car D, it's not the Rolls-Royce.</p> <p>2 Nick Morris' Mercedes is somewhere to the right of the car whose driver is passing the time by logging on to the car's wi-fi system and updating their MugVolume account.</p> | <p>3 Stella Riley is fast asleep in the front seat of her car.</p> <p>4 Car C is an electric blue Bentley Continental GT.</p> <p>5 The driver of car B isn't the one who has been reading the paper and is now attempting the</p> | <p>crossword on the back.</p> <p>Drivers: Barry Austin; Gemma Ford; Nick Morris; Stella Riley</p> <p>Cars: Bentley; Lincoln; Mercedes; Rolls-Royce</p> <p>Activities: reading paper; sleeping; updating MugVolume; watching TV</p> |
|--|--|---|



_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

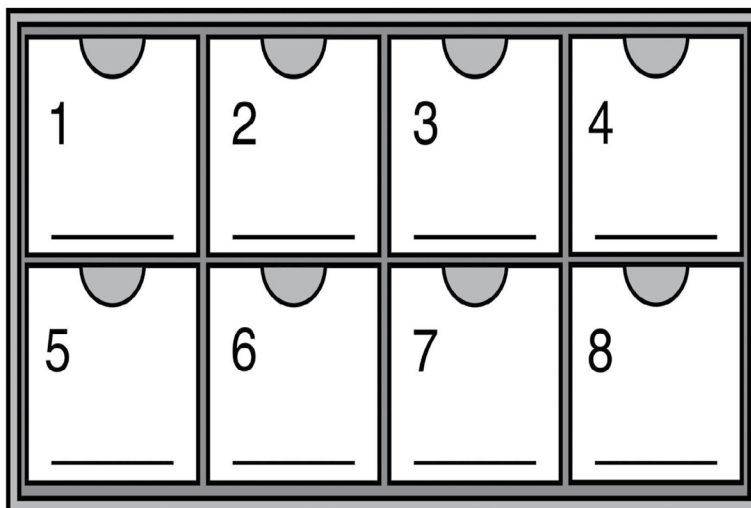
Starting tip: Work out which letter car is driven by Nick Morris.

Box Numbers

Marvin has a small shelving unit with eight boxes in which he stores items that he keeps because... well, you never know. Can you work out what is in each box?

Clues

- | | |
|---|--|
| <p>1 The batteries, partly used and taken from old gadgets, are in a box numbered half that of the one containing marker pens (some of which might still work), which are in the box immediately next to the keys from various locks, cars and houses Marvin no longer owns.</p> <p>2 The shoelaces (the odd ones that didn't snap) are directly above the nuts and bolts left over from flat pack furniture assembly, which are not next to the keys; the power cables, from old electric devices, are directly below the sprung tape measures (you can never have enough of those).</p> <p>3 The old remote controls – from old TVs, hi-fis, and videos – are in an even-numbered box.</p> | <p>Items: batteries; keys; marker pens; nuts and bolts; power cables; remote controls; shoelaces; tape measures</p> |
|---|--|



Starting tip: Work out the items on the top and bottom shelves.

Morning Watch

Judy Side, ace voxpop pollster, was engaged by Fulborough Station to investigate their customers' commuting routines. In the first half hour, she talked to five people who live in Fulborough and work in Central London, commuting daily via King's Cross and the Underground. Can you work out their answers to her four questions: 'What is your name?', 'What business do you work in?' 'How do you get to the station at Fulborough?' and 'Which Underground station do you use?'

Clues

- 1 Howard Gray isn't the person who cycles to Fulborough Station and travels by Underground from King's Cross to Aldgate, nor does he take the tube to Camden Town.
- 2 Brian Askew's wife drives him to the station at Fulborough every morning, on her way to her own job in an estate agent's office; Mr Askew does not work in banking.
- 3 John Kilby works at the London headquarters of a major shipping company; the woman who drives to Fulborough Station every morning in her own car has a job in insurance.
- 4 Diana Ellis travels by Underground between King's Cross and Warren Street, the closest station to her place of work.
- 5 The commuter who travels to Farringdon station on the tube, who is neither Howard

	Banking	Insurance	Publishing	Retailing	Shipping	I catch a bus	I cycle	I drive myself	I walk	My wife drives me	Aldgate	Camden Town	Farringdon	Moorgate	Warren Street
Brian Askew															
Diana Ellis															
Howard Gray															
John Kilby															
Laura Mayes															
Aldgate															
Camden Town															
Farringdon															
Moorgate															
Warren Street															
I catch a bus															
I cycle															
I drive myself															
I walk															
My wife drives me															

Gray nor the one who takes a bus to the station at Fulborough, does not work in publishing.

works in retailing, though in the head office of a supermarket chain rather than in an actual shop.

- 6 The person who gets off the Underground at Moorgate station

Name	Employment	Travel	Station

Up the Isle

The Isle of Remsea is a small rock a mile or so from Brightbourne's Western Harbour off the Eastshire coast and is the location of the annual Newly-wed yacht race in which couples who have yet to celebrate their first wedding anniversary compete for the Paper Trophy by sailing round the isle and back to the harbour. This year's race has six entered yachts each of which is skippered and crewed by a male and female couple still in the early days of marriage. Can you fill in on the picture of the start of the race the name of each yacht and the names of its captain and crew? (For clarity: Betty, Gail, Sue, Audrey, Glenda and Sybil are female, the others are male.)

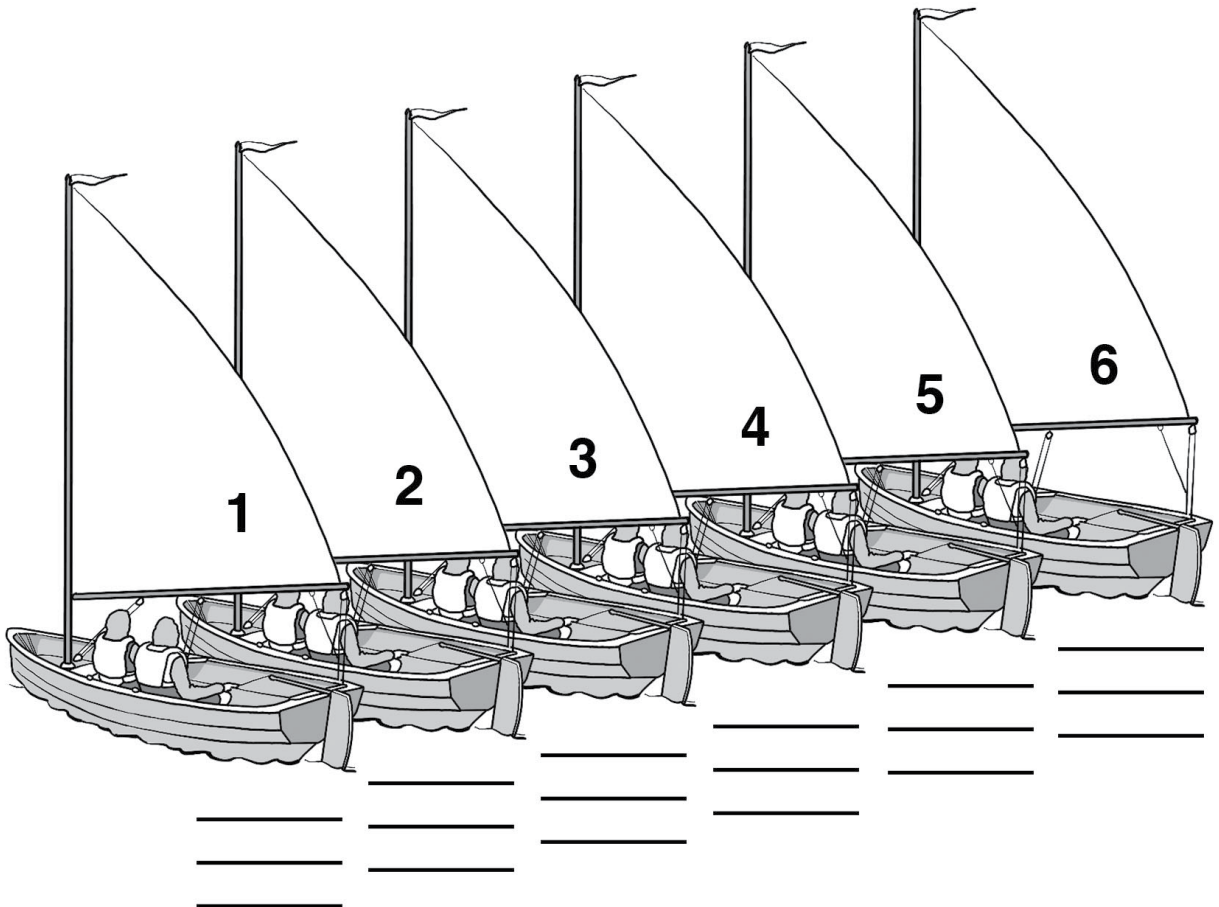
Clues

- 1 Cyril Drake is captain of the yacht numbered two higher than the one crewed by Richard; the latter craft has a name one letter shorter than that of the former.
- 2 Mark and Glenda Nelson's dinghy is shown between *Pirate* and *Flounder*.
- 3 Betty Anson is the captain of yacht 5; her husband and crew isn't Douglas, who is the crewman on *Swan*.
- 4 Sybil is not crewing *Lotus*.
- 5 Yacht 1 is called *Oddball*; dinghy 6 has more than four letters in its name.
- 6 The dinghy captained by Gail Fisher has a lower number than the one manned by Sue Rodney and her husband.

Yacht names: *Flounder; Imp; Lotus; Oddball; Pirate; Swan*

Captains: Betty Anson; Cyril Drake; Gail Fisher; John Keyes; Mark Nelson; Sue Rodney

Crews: Audrey; Douglas; Glenda; Ken; Richard; Sybil



Starting tip: Work out who crews for Betty.

Answers

Morning Fill-up

Kate is drinking tea (clue 3), so Larry, who hasn't ordered orange juice (clue 2) must have ordered coffee. So the bacon sandwich and orange juice (clue 2) must have been ordered by Miriam the roofer (clue 1). Kate isn't eating the porridge (clue 3), so she must have ordered scrambled eggs and tea and is therefore the truck driver (clue 1), leaving Larry as the carpenter having porridge and coffee for breakfast.

Kate, truck driver, scrambled eggs and tea.

Larry, carpenter, porridge and coffee.

Miriam, roofer, bacon sandwich and orange juice.

Mid-morning Top-up

Larry bought the Danish pastry (clue 1), so Miriam, who didn't buy the flapjack (clue 2), must have bought the doughnut and Kate must have bought the flapjack before heading to Churchminster (clue 1). So, she didn't leave at 8.21 (clue 2) and the person going to Stonekeigh left at 8.19 (clue 3), so Kate must have left for Churchminster at 8.17. So, from clue 2, Miriam must have taken her doughnut to Stonekeigh at 8.19, leaving Larry and his Danish pastry leaving for Wallingfen at 8.21.

Kate, flapjack, Churchminster, 8.17.

Larry, Danish pastry, Wallingfen, 8.21.

Miriam, doughnut, Stonekeigh, 8.19.

Knights and Clubs

Sir Coward's club, the Spurs, cannot have met on Monday nights (clue 4) and, since the Wednesday club which met on Wednesday did not have a royal sponsor (clue 1), clue 4 also rules out Wednesday and Thursday for Sir Coward, whose sponsor was therefore not Queen Guinevere (clue 5). That clue also rules him out for Friday, so the Spurs club must have met on Tuesdays. So, from clue 1, King Arthur was the sponsor of the Monday night club. We have now matched two nights with clubs and another two with sponsors, so the Villa club, sponsored by Merlin (clue 7), must have met on Fridays. We now know the Spurs' sponsor was not the King, the Queen or Merlin, and it was Sir Spyness who was assigned to the one sponsored by Sir Lancelot (clue 6), so it must have been Sir Galahad who sponsored the Spurs and Sir Spyness and Sir Lancelot must have been connected to the Wednesday club. From clue 2, the Palace club cannot have met on Thursday or Friday, so it must have been the Monday club sponsored by King Arthur. This leaves Queen Guinevere's Thursday club as the Athletic. So, from clue 3, Sir Sorely must have been attached to the Villa, meeting on Friday, and, from clue 5, Sir Poltroon, who did not attend the Athletic club on Thursday, must have been assigned to the Palace club on Mondays, leaving Sir Timid as the knight attached to Queen Guinevere's Athletic club.

Sir Coward de Custarde, Spurs, Sir Galahad, Tuesday.

Sir Poltroon à Ghaste, Palace, King Arthur, Monday.

Sir Sorely à Frayde, Villa, Merlin, Friday.

Sir Spyness de Feete, Wednesday, Sir Lancelot, Wednesday.

Sir Timid de Shayke, Athletic, Queen Guinevere, Thursday.

Waiting Brief

Gemma Ford drives car D (clue 1) and car C is the Bentley (clue 4), so Nick Morris' Mercedes, which isn't car A (clue 2) must be car B and, from clue 2, the driver of car A must be updating their MugVolume account. Gemma's car D isn't the Rolls-Royce (clue 1), so must be the Lincoln, leaving car A as the Roller. Stella Riley is asleep (clue 3), so she must be snoozing in car C, the Bentley, leaving Barry Austin updating his MugVol account in the Rolls-Royce car A. Finally, Nick Morris in his Mercedes, car B, isn't reading the paper, so that must be what Gemma is doing in car D, the Lincoln, leaving Nick watching TV on the Merc's in-car entertainment system.

A, Barry Austin, Rolls-Royce, updating MugVolume.

B, Nick Morris, Mercedes, watching TV.

C, Stella Riley, Bentley, sleeping.

D, Gemma Ford, Lincoln, reading paper.

Box Numbers

From clues 1 and 2, the batteries, shoelaces and tape measures are on the top row. So, since the marker pens and keys are in boxes next to each other they must both be on the bottom row along with the nuts and bolts and the power cables (clue 2), leaving the remote controls on the top layer. Now, the batteries box, numbered half that of the marker pens (clue 1), must be box 3 or 4. If it were box 4, box 8 would have the pens and box 7 the keys (clue 1). In this instance the remote controls would have to be in box 2 (clue 3) with the laces in box 1 directly above the nuts and bolts in box 5 (clue 2), leaving no room for the cables to be directly under the tape measures (clue 2). So the batteries must be in box 3, with the pens in box 6. Now, for there to be enough room for the laces above the nuts and the tape measures above the cables (clue 2), the keys must be in box 7. So the nuts can't be in box 8 and must be in box 5 with the laces in box 1 and the cables must be in box 8 with the tape measures in box 4, leaving the remote controls in box 2.

**1 shoelaces; 2 remote controls; 3 batteries; 4 tape measures
5 nuts and bolts; 6 marker pens; 7 keys; 8 power cables**

Morning Watch

Howard Gray doesn't cycle to the station (clue 1), nor is he the man who is driven by his wife, who is Brian Askew (clue 2), the woman who drives herself (clue 3), or the person who catches a bus (clue 5), so he must walk. The Underground station he uses is not Camden Town or Aldgate, which is used by the cyclist (clue 1), Warren Street, which is Diana Ellis' station (clue 4), or Farringdon (clue 5), so it must be Moorgate, and he works in retailing (clue 6). John Kilby works in shipping (clue 3) and it's a woman who works in insurance (clue 3), so Brian Askew, who doesn't work in banking (clue 2), must work in publishing. So his station isn't Farringdon (clue 5) and so, as we've already worked out the name or the transport to the station to go with three other tube stops, it must be Camden Town. The person who goes to Farringdon doesn't get to the station by bus (clue 5), so must be the woman who works in insurance and drives to the station and the commuter who takes a bus to the station must be Diana Ellis, whose station is Warren Street, leaving the woman who's in insurance as Laura Mayes. By elimination, John Kilby, who's in shipping, must cycle to the station and must take the tube to Aldgate and Diana Ellis must work in banking.

Brian Askew, publishing, My wife drives me, Camden Town.

Diana Ellis, banking, I catch a bus, Warren Street.

Howard Gray, retailing, I walk, Moorgate.

John Kilby, shipping, I cycle, Aldgate.

Laura Mayes, insurance, I drive myself, Farringdon.

Up the Isle

Richard's not the crew of yacht 5 (clue 1), so Betty Anson's husband and crew in that boat, who isn't Douglas, the crew of *Swan* (clue 3), must be Ken. So, from clue 2, Mark and Glenda Nelson must be in yacht 2, 3 or 4. So, from clue 2, yacht 6 can't be *Pirate* or *Flounder*, nor is it *Imp* or *Swan* (clue 5), and *Oddball* is yacht 1 (clue 5), so yacht 6 must be *Lotus*. We know the Nelsons aren't on *Swan*, and the position of their yacht rules out *Oddball* and *Lotus*. Clue 2 rules out *Flounder* and *Pirate*, so their boat must be *Imp*. We have now named the crews of *Imp* and *Swan* and clue 1 tells us Richard's not in *Flounder*. It can't be boat 6 (clue 1), so Richard must be crew on either *Pirate* or *Oddball* and Cyril Drake must be captain of either *Oddball* or *Flounder*. But Cyril Drake can't be in yacht 1 (clue 1), which rules out *Oddball*, so Cyril Drake must be captain of *Flounder* and Richard the crew of *Oddball*, yacht 1. Therefore, from clue 1, Cyril Drake's *Flounder* must be yacht 3. We now know that Betty and Ken Anson aren't in *Imp*, *Swan*, *Oddball* or *Flounder*, and, as their boat's yacht 5, it can't be *Lotus*, so it must be *Pirate*. So, from clue 2, Mark and Glenda Nelson must be in 4, leaving *Swan*, crewed by Douglas, as yacht 2. Sybil's not the crew of *Lotus* (clue 4), so Audrey must be, and Sybil must be the crew and wife of Cyril Drake in *Flounder*. We have now identified the male captains for two female crews, so Audrey's captain in yacht 6, *Lotus*, must be John Keyes. Finally, from clue 6, Gail Fisher must be captain of yacht 1, *Oddball*, and Sue Rodney of yacht 2, *Swan*.

1, Oddball, Gail Fisher, Richard.

2, Swan, Sue Rodney, Douglas.

3, Flounder, Cyril Drake, Sybil.

4, Imp, Mark Nelson, Glenda.

5, Pirate, Betty Anson, Ken.

6, Lotus, John Keyes, Audrey.