Exercise, Answer 1

Specific solution for berlin tram routes, the minimum number of colours used for routes is seven and which colours used for which routes are follows in below table:

Color name	**Route name**
Red	M1, M2, 16, 18, 37, 61
Blue	M4, M17, 50, 62
Green	M5, 12, 21, 63
Pink	M6, 60
Orange	M8, 67
Yellow	M10, 27, 68
Pink	M13

Answer 2

Step 1: Firstly I select route (M1) and assign red color to it.

Step 2: Then I go to next route (M2) and see whether it intersects with (M1) or not if it intersect with (M1) then we assign different color to M2 and if it is not intersect then we assign same color to M2 as in M1.

Step 3: Similarly, I select other routes like M3 and if it intersect among any of the selected routes M1 and M2 then I don't assign same color(red) to M3 and if it is not intersect then we assign same color to M3, but in this berlin tram route I don't assign red color to M3 according to above procedure.

Step 4: Similarly, we apply same procedure for the all the 22 routes or for much bigger routes as we apply in the above steps if I select route (A) and assign color(N) to it then go to next route(B) if it intersect with route A then we don't assign color N to route B and assign different color to it.

Step 5: Similarly, if we take route C and if it intersect from above both of the route(A,B) then we assign different color to route C, if it not then I assign same color to as A and B, and be alert that we have to check individually for among all the three routes. Similarly this procedure applies for all the 22 routes and for much larger problems.

If I select route (A) and assign color(N) to it then go to next route(B) if it intersect with route A then we don't assign color N to route B and assign different color to it.

Similarly, if we take route C and if it intersect from above both of the route(A,B) then we assign different color to route C, if it not then I assign same color to as A and B.

And be alert that we have to check individually for among all the three or for many routes. Similarly this procedure applies for all the 22 routes and for much larger problems as well.

ANSWER 5: False, I don't need "n" colors I have a counter example let if n=3, if one route intersect the other two routes and the other two routes don't intersect each other, so we assign one colour to first root and the second color to other two routes, now number of colors is two which is not equal to number of routes, similarly it followed for any arbitrary "n".