10.1

22

> Team 4 beats Team 3
> Team 1, 2, 5, 6 beat Team 4

34

> Statement S_1, S_2, S_3, S_4 must be excuted before S_6 is excuted

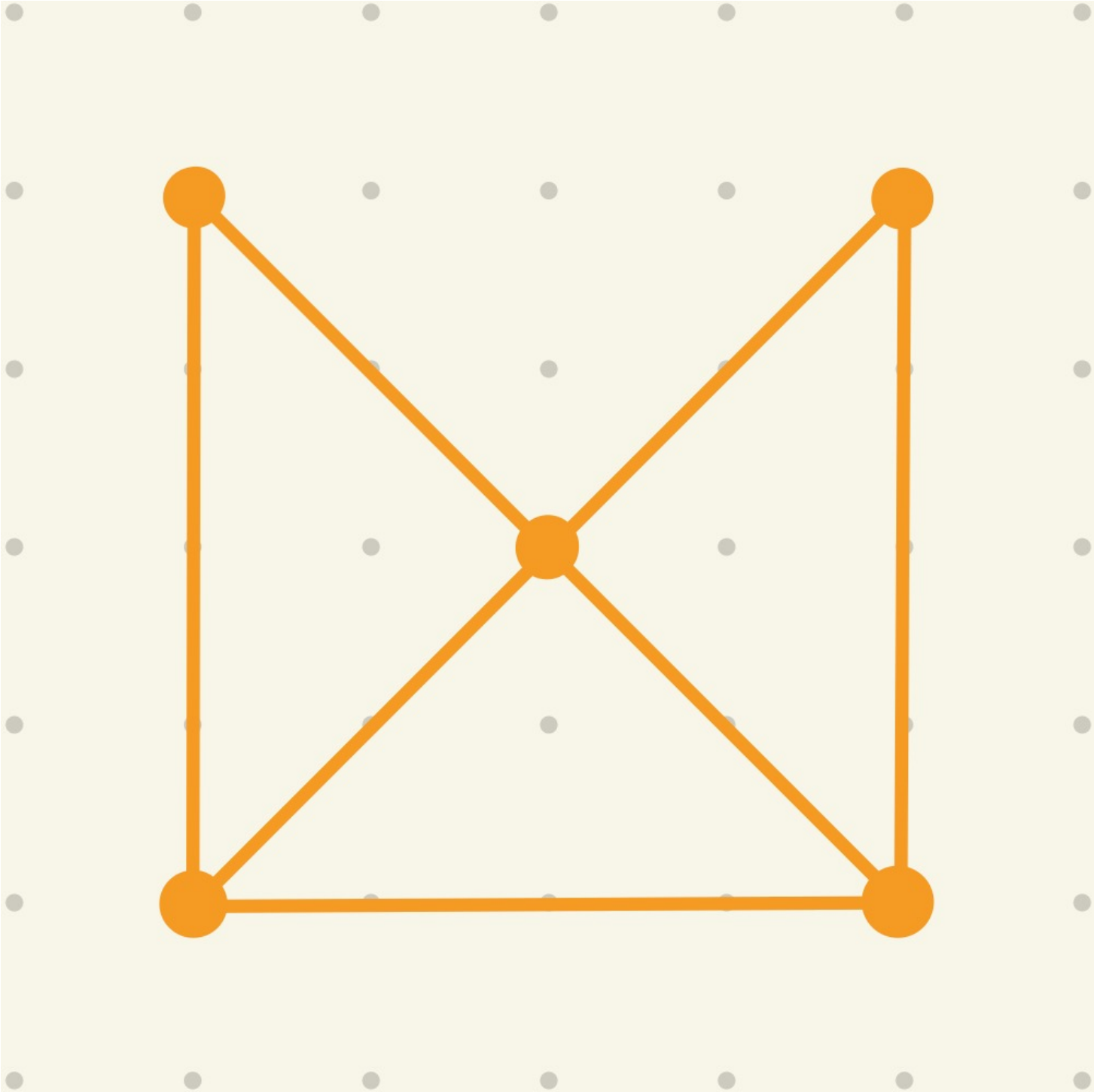
10.2

12

> Assume the vertex below is v
> The degree of v represents the number of people v knows
> The neighborhood of v is the people v knows
> The isolated vertices represent they know nobody
> The pendant vertices represent they know exactly one people
> It means a person knows 1000 people on average

42

> Since every edge contributes 2 degrees, the number of edges is $(4+3+3+2+2)/2=7$



64

> Since $G \cap \overline{G}$ is a complete graph, the new number of edges of each vertex should be 4 - the former one, that is, 0, 1, 1, 2, 2
> Hence the answer is 2, 2, 1, 1, 0

72

> Since G is n-regular and (V_1, V_2) is a bipartition of V, it is obvious that from the perspective of V_1, the degree of the graph is $n|V_1|$ since $\forall v \in V_1,\ \ deg(v) = n$, and wea can get the similar

> result from V_2, $n|V_2|$. Hence we have $n|V_1| = n|V_2|$, $|V_1| = |V_2|$
> Hence they contain the same number of vertices

10.3

28

> 1. Sparse. Since a street intersection has less than 5 edges normally, which is much less than the number of vertices
> 2. Dense. Since nowadays buildings are usually close to each others
> 3. Sparse. Most people do not have brothers or sisters
> 4. Neither. It is hard to say because it depends on the actual situation、

46

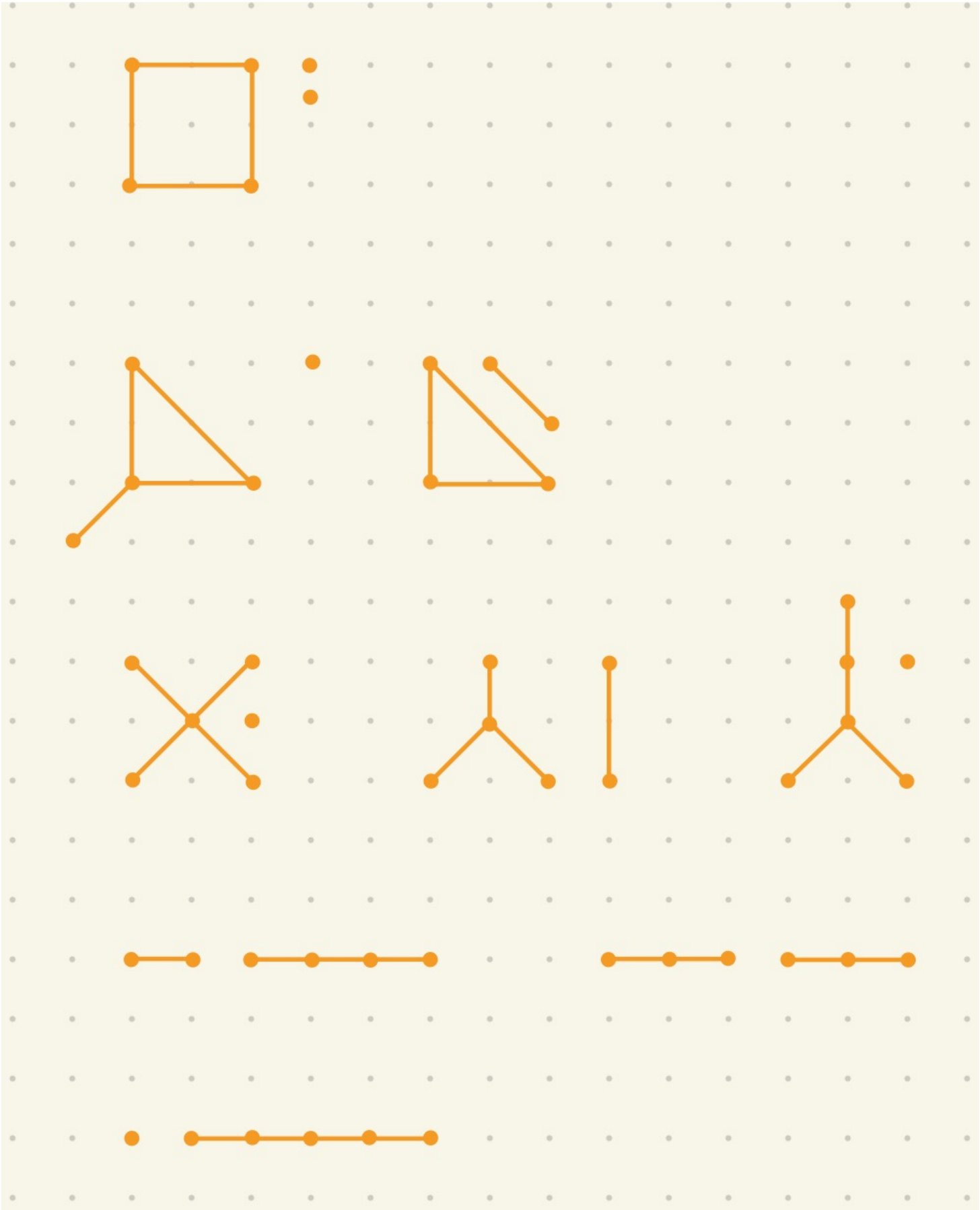
> Not isomorphic. Since the two vertices with 4 degree in the left one are adjacent, but the right onr is not.

52

> The row of a isolated vertex should only contain 0

60

> 9



68

> It is not isomorphic since there is no edge from out-degree = 2(only one vertex in the graph) to in-degree = 2(only one vertex in the graph) in the lest graph, but the right one does.