A variation of the Traveling Salesman Problem is defined as follows:

Input:
1. $N$ cities called $C_1, C_2, \cdots, C_N$.
2. For every pair of cities, $C_i$ and $C_j$, the distance between them is $d(C_i, C_j) > 0$.
3. Two specific cities are designated as $C_x$ and $C_y$.

Output: A tour that has the following properties.
1. The tour visits all the cities.
2. It starts from $C_1$ and ends in $C_N$.
3. It visits $C_y$ after $C_x$.
4. The tour has a minimum length.

Is this variation a combinatorial problem? Explain your answer.

Answer: Yes / No
Yes

Explanation:
A combinatorial problem has a finite number of possible solutions.
 Ignoring the constraints given by $C_1$, $C_N$, $C_y$ and $C_x$, the number of possible solutions is $N!$, which is finite.
The constraints reduce the number of possible solutions, and keep it finite.
A variation of the Traveling Salesman Problem is defined as follows:

Input:
1. $N$ cities called $C_1, C_2, \ldots, C_N$.
2. For every pair of cities, $C_i$ and $C_j$, the distance between them is $d(C_i, C_j) > 0$.
3. Three specific cities are designated as $C_x, C_y$ and $C_z$.

Output: A tour that has the following properties.
1. The tour visits all the cities.
2. It starts from $C_1$ and ends in $C_N$.
3. It visits $C_y$ immediately after $C_x$, and $C_z$ immediately after $C_y$.
4. The tour has a minimum length.

Is this variation a combinatorial problem? Explain your answer.

Answer: Yes / No

Explanation: