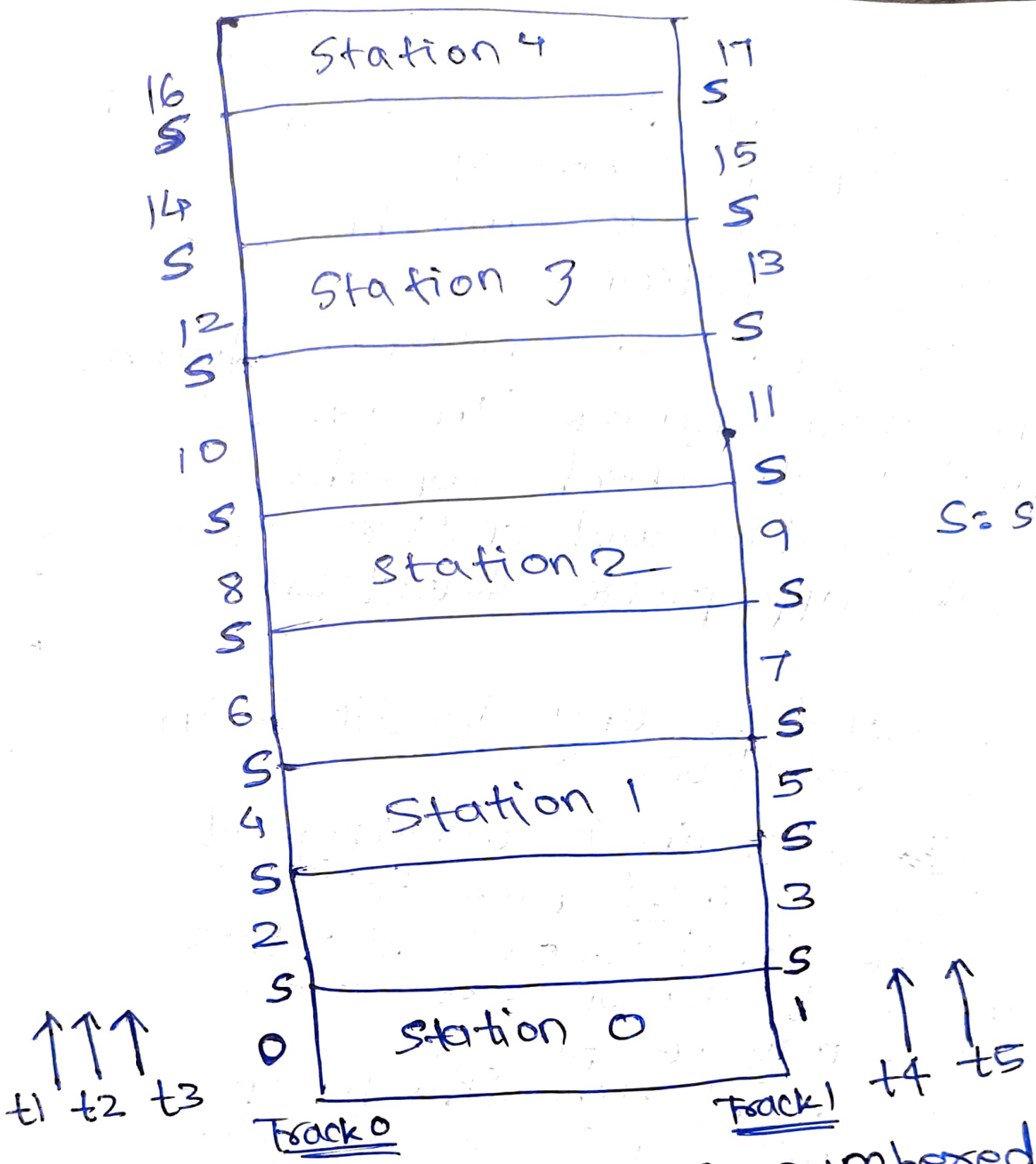

There are 18 semaphores as numbered in different sections of the above railroad diagram as shown.

The semaphores at every station → 0, 1, 4, 5, 8, 9, 12, 13, 16, 17 → have permits = 5 ⇒ there is parking space available for all trains at every station ⇒ it is possible for multiple trains to be together at a station.

The other semaphores have permits = 1 ⇒ these portions are the critical sections. only 1 train is allowed on any of these.

* Track can only be switched when train is currently at a station and wishes to depart from it.
Thus, there are 10 switches → 2 at every station.
* There are 16 signals as indicated with 'S' in the above figure. The job of every signal is to check whether movement is possible and enables the train to take appropriate action.

Claim: There won't be any deadlock in my proposed solution.

→ Suppose a train is waiting at a station. Then, it may have to wait these since the tracks ahead b/w this station & the next station are critical section & thus may be busy.
→ But this will eventually finish, since the trains currently on (portion b/w stations) critical section will be able to move forward since stations have semaphor value of 5.
→ Thus the system won't be permanently stuck at a given point ⇒ no deadlock