COVID-19 is spreading rapidly. Queensland Health has finally decided to invest in some new advanced computer programs for contact tracing.

Currently, they have a database storing a list of person-to-person contact traces of the form of a tuple (P_i , P_j , t_k), where P_i and P_i and P_j are the two people involved in the interaction that happened at time t_k. Note that traced interactions are directionless, as in the trace (A, B, t_k) is the same as the trace (B, A, t_k).

They have hired you to improve their algorithms for contact tracing by extending this current system.

a. Implement constructors which takes as input a list of check-ins of the form described above. Additionally, implement a function which adds a new contact trace datum to the internal data structure.
b. Implement a function which returns a list of times that two people have been in direct contact in the tracing data. This list should be returned in ascending order of time.
c. Implement methods which take as input a person and then return the set of people that person has come into direct contact with in the tracing data. Only return contacts that have happened at or after the given timestamp.
d. Implement an algorithm to help find potential infectees from a given source.
   That is, given a person P who become contagious with COVID-19 at exactly time t, we want to find all the people who now may have contracted COVID-19 from person P (and therefore need to be contacted for testing and tracing), or may have contracted it from someone else who P has infected (and so on...).
   We will assume the following:
   - If a person comes into contact with COVID-19 at time t and they do not have it already, they might contract the virus and become contagious at exactly t + 60 minutes.
   - If a person is contagious with COVID-19 at time t, then they may instantly spread it to anybody they come into contact with at or after time t.

   Implement an efficient algorithm that takes a person P, who became contagious with COVID-19 at time t, and return the set of all other people in the dataset who may now have contracted COVID-19 under the above assumptions.

   Small example: Suppose your contact tracing database has the following information (note: this is not necessarily how you may choose to store this information but just a representation of it).

Person 1	Person 2	Time
Anna	Sanni	1st October 3PM
Anna	Matt	2nd October 8PM
Matt	Kristian	3rd October 9PM
Kristian	Sanni	3rd October 9:30PM
Kristian	Kenton	3rd October 11PM
Kristian	Max	3rd October 11PM
Kenton	Kristian	4th October 10AM

Table 1 - Representation of example database

   If Anna became contagious with COVID-19 at 1st October 3:30PM, then Matt, Kristian, Kenton, and Max would need to be contacted for tracing due to possible transmission.