Whops!-logs

The service Whops! allows users to transfer money between each other using an app. They try to avoid storing information about their users whenever possible, preferring that information is stored on the phones of their users.

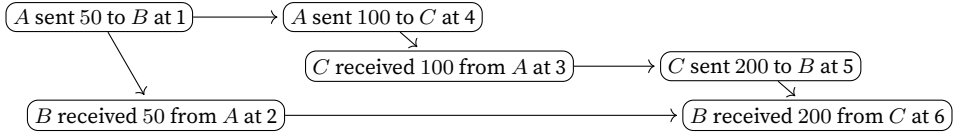
Once in a while, they need to get a complete log of transactions within a time period, in order to debug their system. To do this, they fetch the *local* logs from a set of phones in the system. A local log is a list of events, where each event represents a payment being sent or received. Every event contains a timestamp, conveying when the payment was sent or received. For simplicity, the timestamps are represented as positive integers. The following is a small example of three logs from phones A, B and C.

A	B	C
A sent 50 to B at 1	B received 50 from A at 2	C received 100 from A at 3
A sent 100 to C at 4	B received 200 from C at 6	C sent 200 to B at 5

Sadly, the timestamps from the phones are unreliable. They often observe a payment being received *before* the payment was sent, according to the timestamps. In the example above, C receives a payment of 100 *before* A has sent that payment to C.

To approximate a correct log, they construct a directed graph $G = (V, E)$, where each event is represented with a vertex. If two events u and v appear adjacently in a local log, then the graph contains a directed edge (u, v). For every event u that represents a payment being sent, the graph contains a directed edge (u, v), where v is the corresponding

reception of the payment. Here is the graph for the example above:



The desired complete log for this example is:

A sent 50 to B at 1
B received 50 from A at 2
A sent 100 to C at 4
C received 100 from A at 3
C sent 200 to B at 5
B received 200 from C at 6

Every vertex v may access the timestamp from the log by $v.\texttt{ts}$. Give an algorithm that takes a directed graph $G = (V, E)$ as input, and prints all vertices in V in an order such that:

- If there is an edge from u to v, then u is printed before v.
- u is printed before v if $u.\texttt{ts} < v.\texttt{ts}$, if this does not violate the first requirement.