

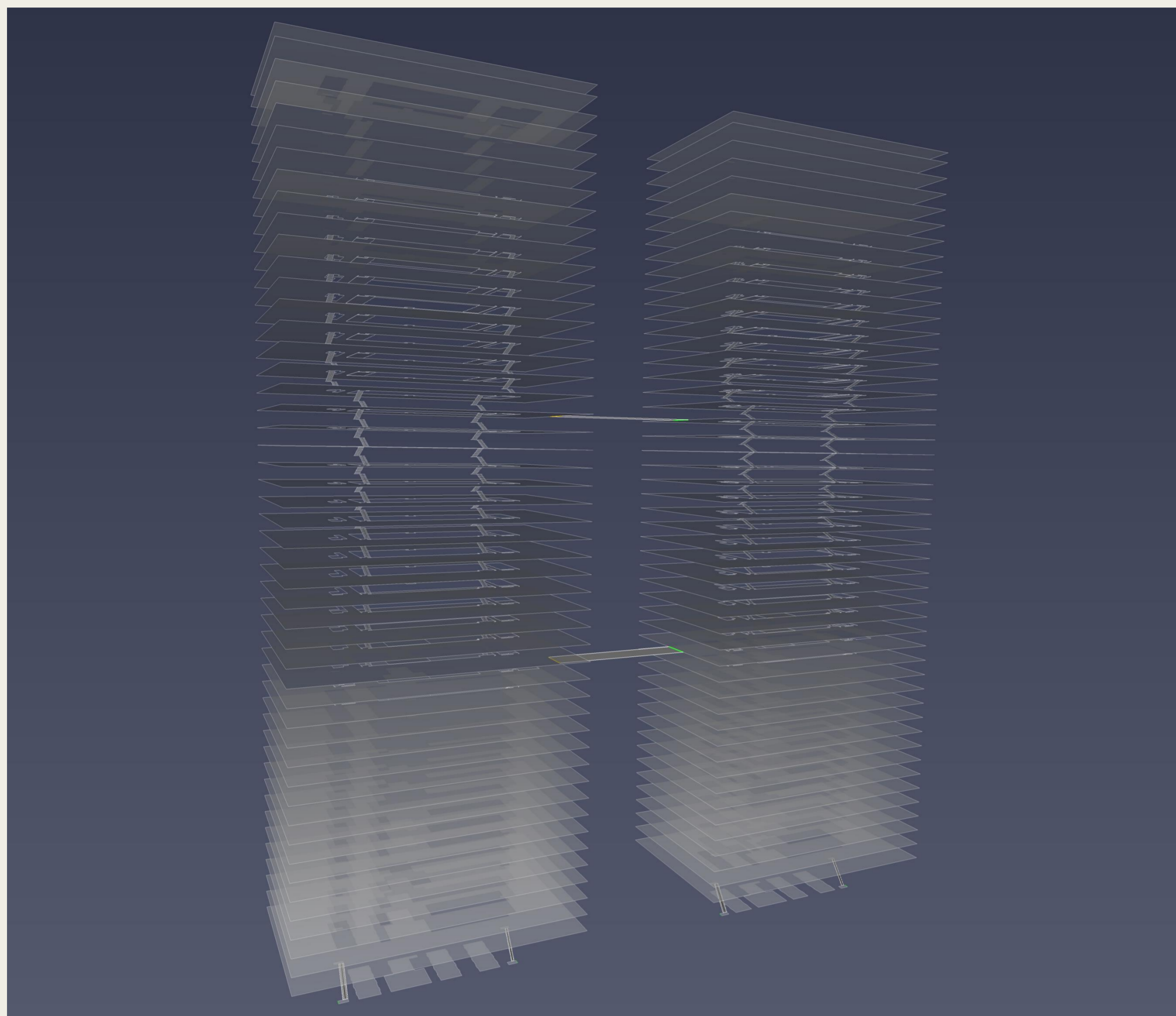


Modelling the impact of sky-bridges on total evacuation in high-rise buildings



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Sky-bridges are enclosed spaces linking buildings at height. Their usage in case of fire evacuation of high-rise buildings has been scarcely studied.

The impact of different design and behavioural factors associated with sky-bridge usage has been investigated:

- The height of the building
- The number of sky-bridges
- The allocation of occupants to the sky-bridges

Five evacuation scenarios, which include use of both stairs and sky-bridges, have been investigated with the evacuation model Pathfinder.

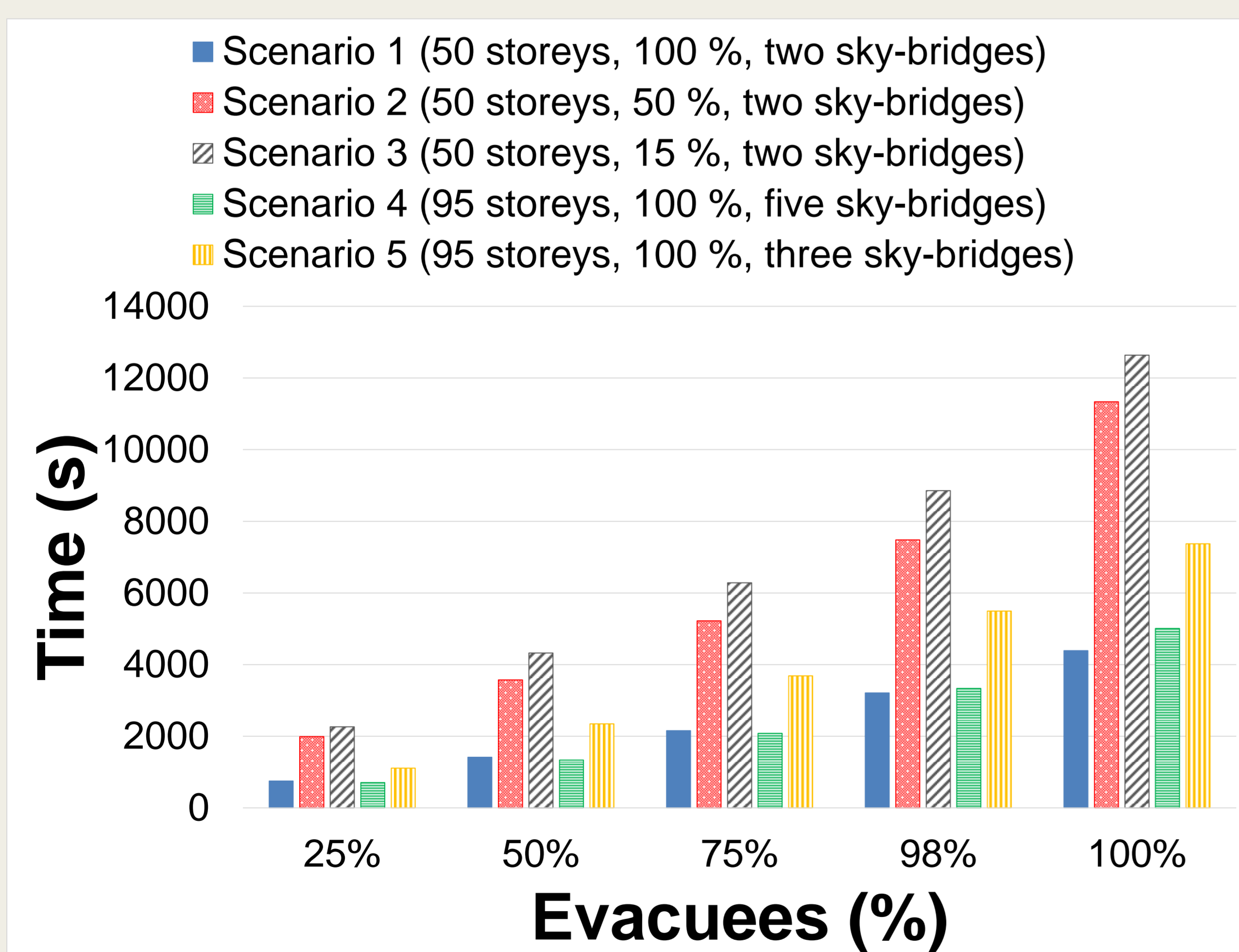
Scenarios

Modelling assumptions are based on a previous study conducted by Ronchi and Nilsson in which evacuation modelling is used to investigate total evacuation strategies in **high-rise buildings**.

The building includes different heights, two stairs and sky-bridges (2, 3 or 5) with different usages. The total population for the 50-storey building is 8372 occupants and 16562 occupants for the 95-storey building.

#	Floors [n]	People using sky-bridges [%]	Sky-bridges [n]	Sky-bridge inter-distance [floors]
1	50	100	2	15/16
2	50	50	2	15/16
3	50	15	2	15/16
4	95	100	5	15/16
5	95	100	3	22/23

Modelling results



Discussion

In the scenarios in which an optimal usage of sky-bridges is simulated, it has been found a reduction of:

- Travel distances
- Evacuation times
- Congestion levels

A sub-optimal usage of sky-bridges may create **congestions** and longer evacuation times.

Since human behaviour and risk perception can be different for individuals, the best way to obtain knowledge on this subject is to carry out **experimental studies** where occupant behaviours can be observed.

References

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 Ronchi, E., Nilsson, D., 2013. Fire evacuation in high-rise buildings: a review of human behaviour and modelling research. Fire Science Reviews 2, 7

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