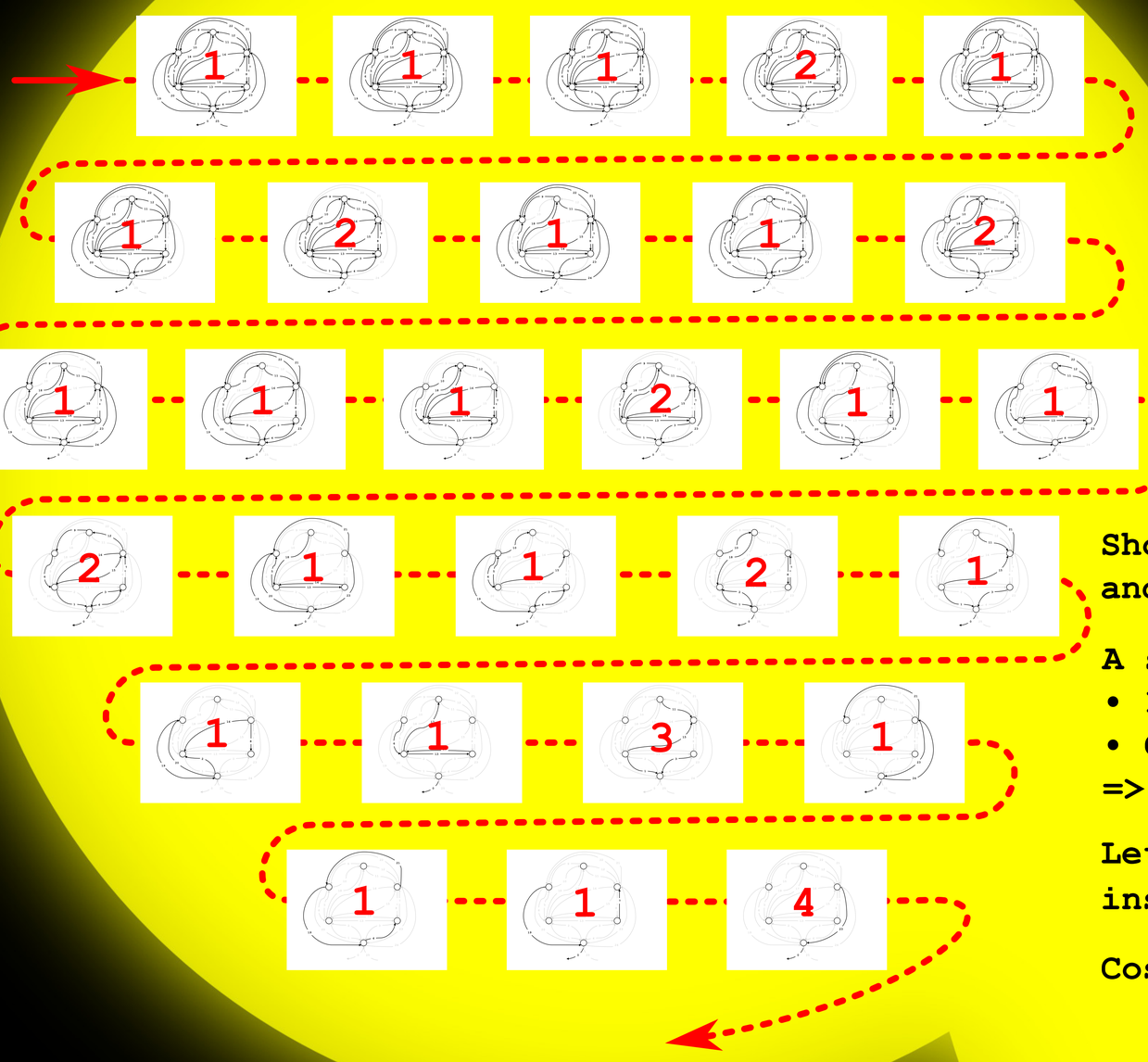
HC2 2012
Maya

Heidi's way out



(3) Emergency

Show the pyramid to your computer ;-)
and re-use code from the previous subtask.

A state needs one bit per directed corridor
- 1 if a copy of Heidi is there, else 0
- Can you see why this is sufficient?

=> 2^{26} = 67 Mio. states

Let H_i = the number of "Heidis" that are still inside, i.e. the number of bits set in state S_i.

Cost to get from state S_i to S_{i+1} using exit e:

$$e \cdot (H_i - 1)$$

Too slow :-(
=> Run it locally :-)
=> Or use A*-optimization using this incremental cost function:

$$e \cdot H_i - H_i(H_i - 1)/2 + H_{i+1}(H_{i+1} - 1)/2$$

(2) Efficiency

Find the shortest path through the graph, where the cost is the n° of corridors counted.

Each state consists of
- the current room
- the (directed) corridor to step in
- a flag indicating whether the calendar has been found

=> R•C•2 states

Dijkstra's algorithm (with a heap) solves this in O(RC log(RC))

(1) Feasibility

Use a floodfill.
Program it using depth-first search or breadth-first search

R = #rooms
C = #corridors

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