
MAMS COAL COMPANY
Kim, Neil, Toyesh, Ishita

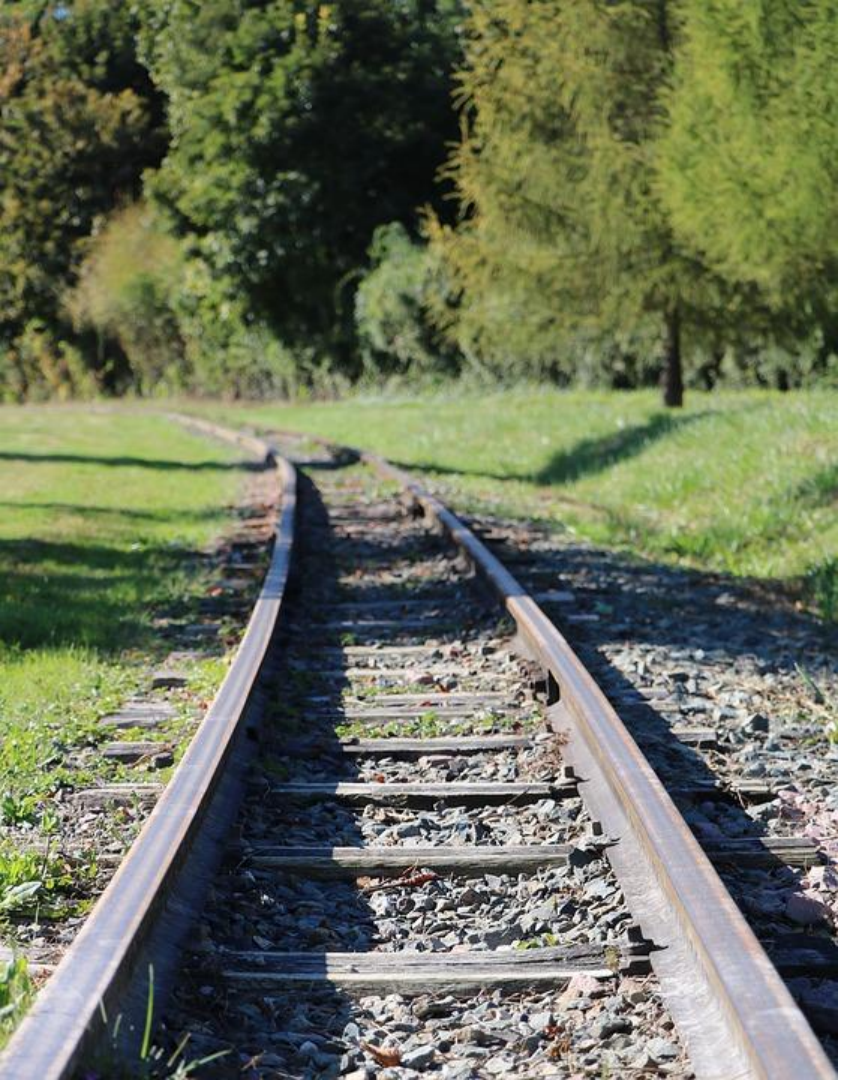
PROBLEM STATEMENT

The MAMS Coal Company is trying to find an approximate expected annual value for running a tipple in relation to the costs of paying the crews which fill the tipple, as well as the demurrage costs which need to be paid to trains as they wait at the depot to be filled.

The team is also tasked with finding how often a second crew should be called out, average monthly demurrage costs, a daily schedule to minimize demurrage costs, if it would be cost effective to add a third loading crew to the operation, and if a fourth train could be supported daily

GIVENS

- 3 trains arrive each day any time between 5 am and 8 pm
  - Either 0, 1, 2, or 3 trains can be waiting at the depot at any given time
  - If a train is at the depot and not being filled, a dimmurage of $5000 per hour must be paid
- There is the possibility of up to 2 crews which are able to fill the tipple
  - One crew can fill the tipple with .25 train loads of coal in an hour. Costs $6000 per hour to hire one crew
  - Two crews can fill the tipple with .5 train loads of coal in an hour. Costs $21000 to hire two crews
- The tipple can hold a maximum of 1.5 trainloads of coal

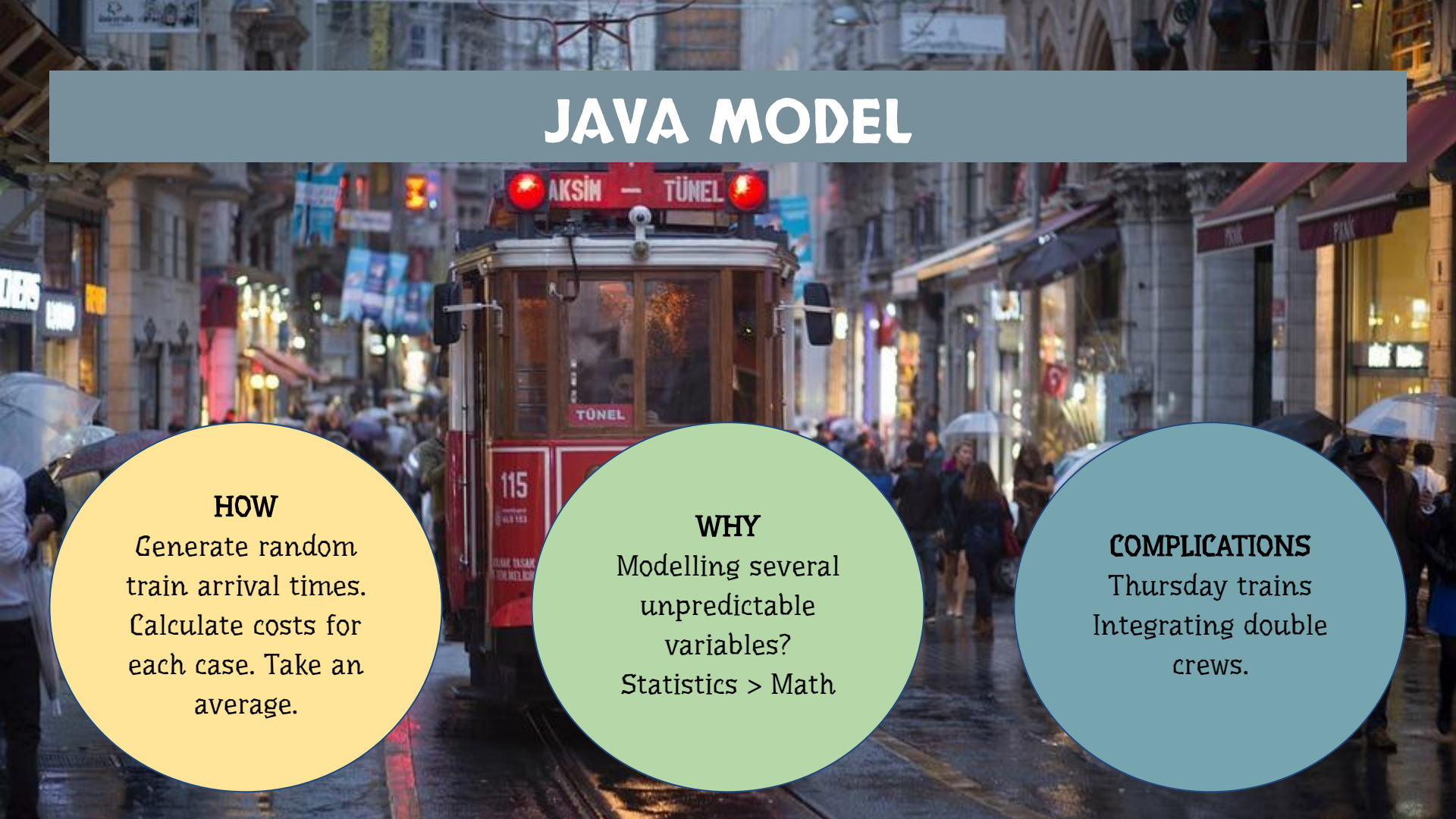


ASSUMPTIONS

- Tipple loading is done in one hour intervals
    - Thus, can be loaded in intervals of .25 by one crew and .5 by two crews
- Tipple can be filled at any time, including overnight
- Trains must arrive within allotted time frame, but can be held and filled until after hours.
- Can leave coal in the tipple overnight
- Must pay workers in full hours
- Trains may only be sent with a full load

Price/hr	# of instances in table	Verbal summary
0	1	0 trains waiting, 0 crews loading
9	2	0 trains waiting, 1 crew loading
15	3	1 train waiting, 0 crews loading
21	1	0 trains waiting, 2 crews loading
24	6	1 train waiting, 1 crew loading
30	3	2 trains waiting, 0 crews loading
36	3	1 train waiting, 2 crews loading
39	6	2 trains waiting, 1 crew loading
45	1	3 trains waiting, 0 crews loading
51	3	2 trains waiting, 2 crews loading
54	2	3 trains waiting, 1 crew loading
66	1	3 trains waiting, 2 crews loading

JAVA MODEL



HOW

Generate random train arrival times. Calculate costs for each case. Take an average.

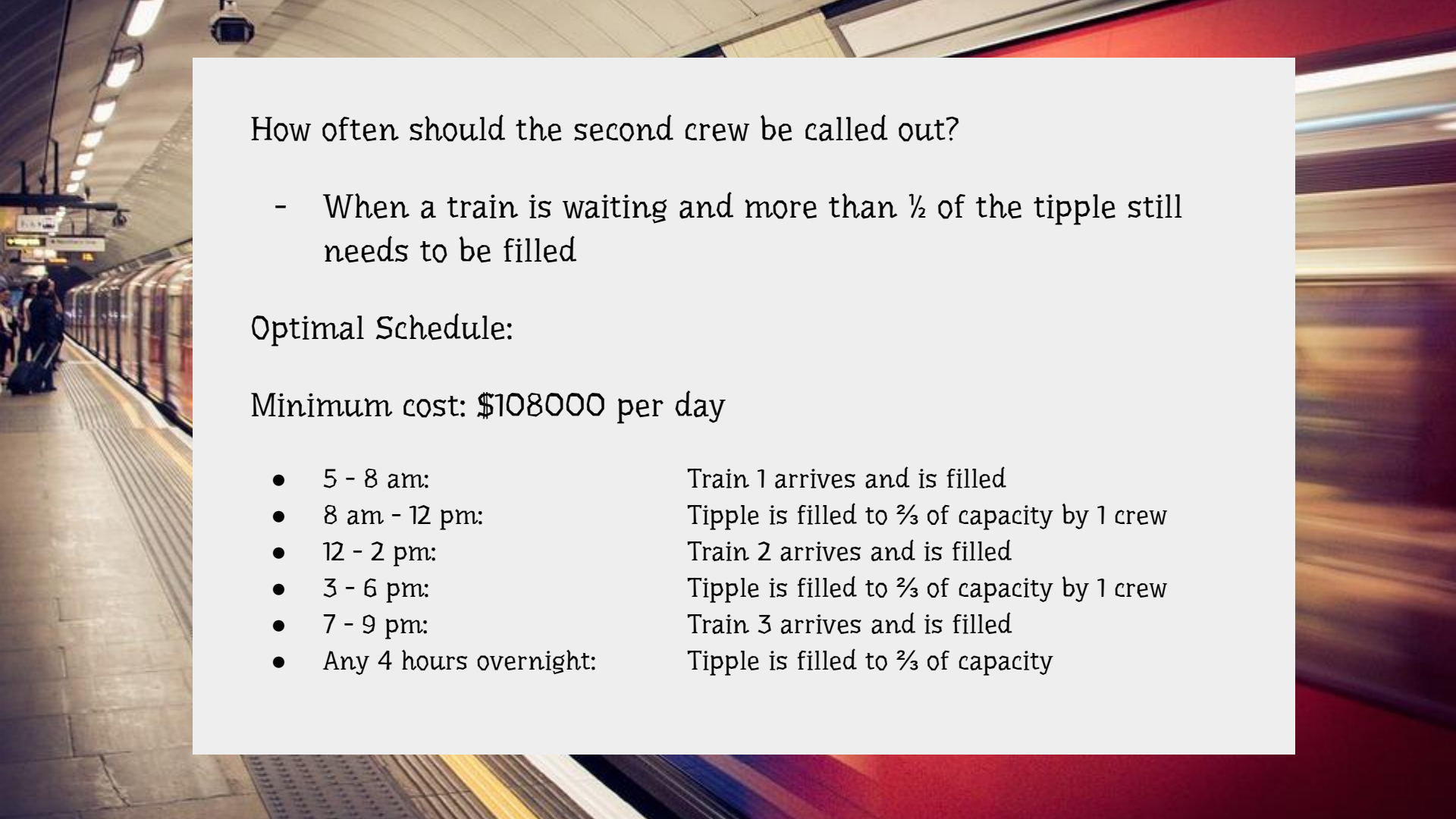
WHY

Modelling several unpredictable variables?
Statistics > Math

COMPLICATIONS

Thursday trains
Integrating double crews.


100,000,000
Yep.We really did



How often should the second crew be called out?

- When a train is waiting and more than ½ of the tipple still needs to be filled

Optimal Schedule:

Minimum cost: $108000 per day

• 5 - 8 am:	Train 1 arrives and is filled
• 8 am - 12 pm:	Tipple is filled to ⅔ of capacity by 1 crew
• 12 - 2 pm:	Train 2 arrives and is filled
• 3 - 6 pm:	Tipple is filled to ⅔ of capacity by 1 crew
• 7 - 9 pm:	Train 3 arrives and is filled
• Any 4 hours overnight:	Tipple is filled to ⅔ of capacity