MODELOFF™

Financial Modeling World Championships 2017

Round 2 Section 2 - Case Study Information Pack

Section 2: Late Again

Relates to Questions 14-25

45 Marks available in this Section - Estimated time is 50-75 minutes

INSTRUCTIONS

You are employed by a local provider of heavy rail passenger services called ModelOff Trains ("MOT"). You have been provided 5 weekdays of data on train performance and need to conduct analysis on the data for senior management at MOT. There are three parts to the required analysis:

Part 1) Create a full schedule of all 840 data points that MOT collect daily (questions 14 - 15).

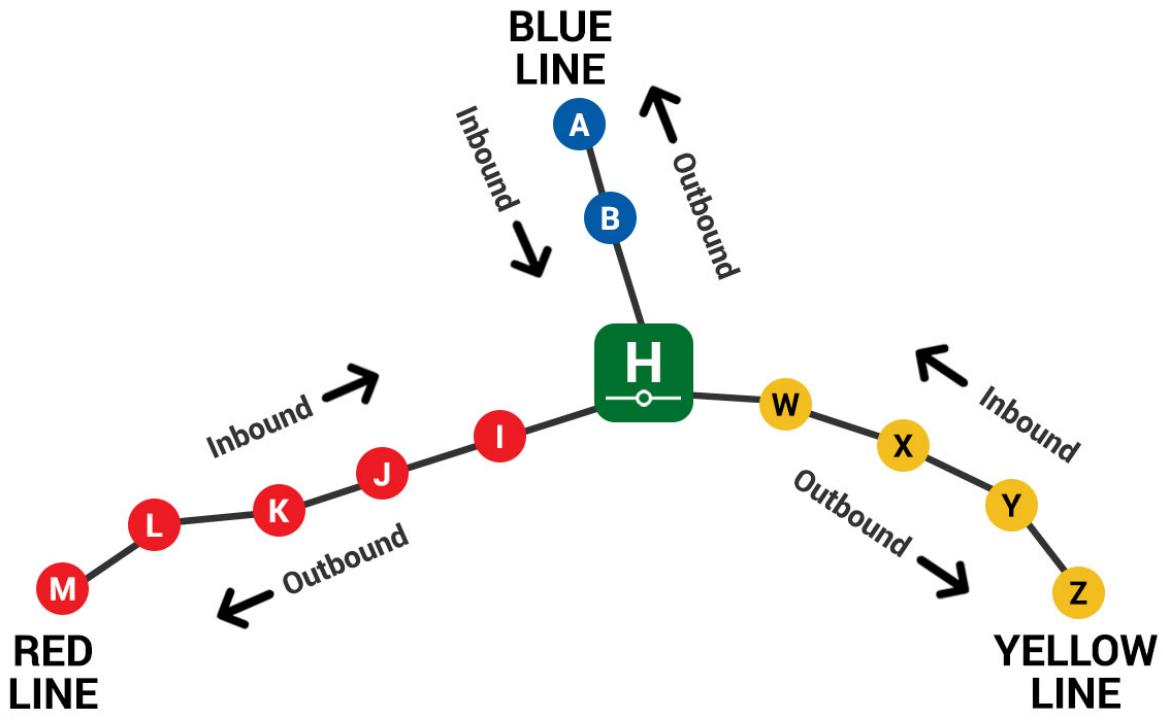
Part 2) Clean up the data provided from the MOT systems (of the actual time) into a form usable for analysis
(questions 16 - 19).

Part 3) Answer certain questions put to you by MOT senior management (questions 20 - 24).

It is recommended that you read the questions for all parts before beginning your modeling.

BACKGROUND

The rail network has 3 lines. These are the Blue line (3 stations), Red line (6 stations) and Yellow line (5 stations). All stations feed a central transport hub known as 'H'. Travel occurs in both directions with two sets of tracks per line (one track inbound, one track outbound). Travel towards 'H' is referred to as Inbound and traffic away from it as Outbound. The rail network is shown in the diagram below.



SCHEDULE

The weekday schedule for all three lines is provided below (and is contained in the provided Excel workbook).

There are four periods each day when service is provided (AM, Mid, PM and Evening). The frequency within each period is provided. For example, for the Red Inbound AM service, the first train departs M at 7am and runs every 20 minutes. Therefore services will depart M at 7:00am, 7:20am, 7:40am, 8:00am, 8:20am and 8:40am. The first Mid service departs at 9:00am.

The times listed are the scheduled departure times from each station (with the exception of the last stop on each line, which is the scheduled arrival time).

Red - Inbound

	Frequency (mins)	M	L	K	J	I	H
AM	20	7:00 AM	7:10 AM	7:17 AM	7:23 AM	7:29 AM	7:33 AM
Mid	30	9:00 AM	9:10 AM	9:17 AM	9:23 AM	9:29 AM	9:33 AM
PM	40	5:00 PM	5:10 PM	5:17 PM	5:23 PM	5:29 PM	5:33 PM
Evening	60	7:00 PM	7:10 PM	7:17 PM	7:23 PM	7:29 PM	7:33 PM
Final service		11:00 PM	11:10 PM	11:17 PM	11:23 PM	11:29 PM	11:33 PM

Red - Outbound

	Frequency (mins)	H	I	J	K	L	M
AM	40	7:00 AM	7:04 AM	7:10 AM	7:16 AM	7:23 AM	7:33 AM
Mid	30	9:00 AM	9:04 AM	9:10 AM	9:16 AM	9:23 AM	9:33 AM
PM	20	5:00 PM	5:04 PM	5:10 PM	5:16 PM	5:23 PM	5:33 PM
Evening	60	7:00 PM	7:04 PM	7:10 PM	7:16 PM	7:23 PM	7:33 PM
Final service		11:00 PM	11:04 PM	11:10 PM	11:16 PM	11:23 PM	11:33 PM

Yellow - Inbound

	Frequency (mins)	Z	Y	X	W	H
AM	20	7:00 AM	7:12 AM	7:20 AM	7:25 AM	7:28 AM
Mid	30	9:00 AM	9:12 AM	9:20 AM	9:25 AM	9:28 AM
PM	40	5:00 PM	5:12 PM	5:20 PM	5:25 PM	5:28 PM
Evening	60	7:00 PM	7:12 PM	7:20 PM	7:25 PM	7:28 PM
Final service		11:00 PM	11:12 PM	11:20 PM	11:25 PM	11:28 PM

Yellow - Outbound

	Frequency (mins)	H	W	X	Y	Z
AM	40	7:00 AM	7:03 AM	7:08 AM	7:16 AM	7:28 AM
Mid	30	9:00 AM	9:03 AM	9:08 AM	9:16 AM	9:28 AM
PM	20	5:00 PM	5:03 PM	5:08 PM	5:16 PM	5:28 PM
Evening	60	7:00 PM	7:03 PM	7:08 PM	7:16 PM	7:28 PM
Final service		11:00 PM	11:03 PM	11:08 PM	11:16 PM	11:28 PM

Blue - Inbound

	Frequency (mins)	A	B	H
AM	20	7:00 AM	7:16 AM	7:24 AM
Mid	30	9:00 AM	9:16 AM	9:24 AM
PM	40	5:00 PM	5:16 PM	5:24 PM
Evening	60	7:00 PM	7:16 PM	7:24 PM
Final service		11:00 PM	11:16 PM	11:24 PM

Blue - Outbound

	Frequency (mins)	H	B	A
AM	40	7:00 AM	7:08 AM	7:24 AM
Mid	30	9:00 AM	9:08 AM	9:24 AM
PM	20	5:00 PM	5:08 PM	5:24 PM
Evening	60	7:00 PM	7:08 PM	7:24 PM
Final service		11:00 PM	11:08 PM	11:24 PM

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PART 1 – FULL TRAIN SCHEDULE (QUESTIONS 14 – 15)

Based on the schedule information provided, complete a full list of all 840 stops scheduled to occur in one day.

PART 2 – CLEANING THE DATA (QUESTIONS 16 – 19)

Data has been provided for 5 weekdays (a total of 4,200 data points). Unfortunately, there are a variety of data input methods that can be used and as such the data needs to be put into a standardized format for meaningful analysis to be completed. Each data point is a single cell and contains three fields that must be extracted. These are:

1) **Date**. Between 6 and 10 November inclusive. There are two date formats used: for example, 6 November will be shown as either 6-Nov or 6/Nov.
2) **Time**. The actual departure time (or arrival time for the last stop on the line). This is always expressed in the same format and includes AM/PM.
3) **Station code.** This consists of three letters showing the line, direction of travel and the station the departure/arrival occurs at (using the first letter of each).
   For example, a departure on the **R**ed line on the **I**nbound direction from station **K** would have the 3 letter code **RIK**. Sometimes there are additional characters in this code (i.e. RIK or R:I:K or R-I-K or R/I/K).

Additionally, these three fields can occur in any order. There is always a single space separating each of the fields.

PART 3 – ANALYZING THE DATA (QUESTIONS 20 – 24)

Once the data is cleaned up, you can compare it against the schedule you calculated in Part 1 to answer these questions.

For Questions 14-18, 20-22, select your answer from a multiple choice list.
For Questions 19, 23- 24, you are required to type in your answer.

Prepare your model and then use it to answer the given questions.
When finished, please upload your workbook (Question 25).