

## **FLIGHT DELAYS/DETERMINISTIC QUEUEING MODELS**

Three airlines (A, B, C) have scheduled flights (1 – n) for the morning peak hour departure bank as described in the chart below. There is a single runway that can handle one flight per slot.

- 1) Complete the Queuing Diagram by filling in the sequence of departing flights. The grey cells represent the departure slot (10 pts)
- 2) Compute the # of Flights in the Queue for each Departure Slot. Enter this information in the row labeled "# Flights in Q". (10 pts)
- 3) Compute the Total Delay per Flight. Enter this information in the column labeled "Total Delay per Flight." (10 pts)



1) The max Number of Flights in the Departure Queue (2 pts)

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2) Determine the Total Time the Departure Queue is present (2 pts)

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3) The Total Delay Time for all the flights (2 pts)

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4) the Expected Delay for each Flight (in units of # of slots) (2 pts)

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5) If one flight was cancelled, and subsequent flights were moved-up to fill the vacated slot, which flight would reduce the Total Delay the most (2 pts)

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6) If one flight was cancelled, and subsequent flights were moved-up to fill the vacated slot, which flight would reduce the Total Delay the least (2 pts)

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7) Proportional Equity

i. Compute Proportional Equity for Airline A

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ii. Compute Proportional Equity for Airline B

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iii. Compute Proportional Equity for Airline C

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iv. Explain causes of the differences in Proportional Equity between the Airlines

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8) Exempted Flight

i. What is an exempted flight

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ii. How does an exempted flight affect the Total Delay Time for all flights. Explain?

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9) Schedule Compression

i. What is Schedule Compression

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ii. How does Schedule Compression affect the Total Delay Time for all flights. Explain?

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