



Case Study – Purple City

Question Appeared in: ModelOff 2014 Round 2

Time Allocated: 30 minutes

INTRODUCTION

You have taken on a role in the organising committee for the 2015 Underwater Football World Championship. Your first task is to help the committee understand the potential total cost of flights for the championship. As part of this, you will need to build a model to allow you to identify flight details and costs for all domestic flights for each team in the Championship.

In order to calculate the potential cost, you are provided with the following information about the tournament:

- 1) The tournament consistent of 24 teams divided into four pools, each containing six teams. Each has an animal name that the team is referred to by.
- 2) There are 60 pool games followed by 7 finals games.
- 3) There are 12 cities in the country that games are held at. Each city is named after a colour.
- 4) All teams will start and end the tournament at Purple City as this has the country's main international airport. The costs of the international flights to arrive at, and depart from, the tournament are paid for by the individual teams so are not to be included in this analysis.
- 5) Whenever a team travels, flights for the entire squad of team personnel must be arranged.
- 6) The organising committee has taken a view on which teams will progress to each game in the finals for the purposes of calculating these costs. Base your modelling on the assumption that the finals will be played by the specified teams (shown in the supporting Excel file).

SUPPORTING DATA

The required information has been collated by the organising team and given to you in an Excel file. This file includes:

- 1) A list of the teams competing
- 2) A list of the cities where games are played
- 3) The total number of personnel per team requiring flights (the squad size)
- 4) The teams involved in, date of, and venue used, for each game
- 5) The flight costs per person between each location

HINT: When designing your model, to answer all questions you may find it useful for your model to calculate: Flights costs by team; Flight costs by departure city; Flight costs by arrival city; Flights costs within a specified range of dates; Flight costs if some game venues change from the base case.



QUESTIONS

Question 1

What is the total expected number of flights the Elephants will need during the tournament? Hint: Remember that teams start and end at Purple City.

- a. 4 flights
- b. 5 flights
- c. 6 flights
- d. 7 flights

Question 2

What is the total expected flight cost for the Frogs?

- a. \$15,246
- b. \$16,548
- c. \$24,612
- d. \$25,431

Question 3

What is the total expected flight cost for the competition?

- a. \$587,223
- b. \$632,499
- c. \$664,713
- d. \$666,414



Question 4

What is the total cost for all flights to Lime City?

- a. \$46,242
- b. \$47,985
- c. \$48,930
- d. \$49,014

Question 5

What is the total flight cost for all flights from Blue City?

- a. \$59,871
- b. \$60,690
- c. \$61,803
- d. \$62,160

Question 6

What is the total flight cost for all flights to games held between 11 May and 19 May (inclusive)?

- a. \$126,630
- b. \$127,890
- c. \$128,940
- d. \$129,045



ModelOff 2014 - Round 2

Question 7

The organising committee want to assess the impact on the total flight cost if all teams start and end the tournament at Green City rather than Purple City. What is the total expected flight cost if this happens?

- a. \$626,829
- b. \$663,978
- c. \$675,843
- d. \$716,415

Question 8

Due to construction issues, all games at the Blue City may need to be moved to the Orange City. What will be the impact on the total expected flight cost if this happens? (For this question, make sure the start/end city has been reset to the Purple City.)

- a. \$7,917 increase
- b. \$9,723 decrease
- c. \$21,462 decrease
- d. \$32,256 decrease



Answers

1	B
2	A
3	B
4	A
5	C
6	D
7	C
8	C