7. Western Airlines needs to assign its crews to cover the 11 flights shown in the table below. They have developed 12 feasible sequences of flights for the crews (The numbers in the columns represent the order of the flights or legs of each sequence. Some sequences consist of only two flights, while other sequences involve as many as five flights). The cost of assigning a crew to a particular sequence of flights is given (in thousands of dollars) in the bottom row of the table. As indicated by the ones, all flights originate from San Francisco and end up in San Francisco. For instance, in sequence 9, there are five flights – SF to Seattle, then Seattle to LA, then LA to Chicago, then Chicago to Denver and finally Denver to SF for a total cost of $2(000). Since they have only three crews, at most only three of the sequences can be chosen. However, the three chosen sequences must cover all 11 flights. Determine which three sequences should be selected in order to minimize the total cost of the crew assignments and cover all 11 flights.

 **Feasible Sequence of Flights**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Flights** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** |
| 1 | SF to LA | 1 |  |  | 1 |  |  | 1 |  |  | 1 |  |  |
| 2 | SF to Denver |  | 1 |  |  | 1 |  |  | 1 |  |  | 1 |  |
| 3 | SF to Seattle |  |  | 1 |  |  | 1 |  |  | 1 |  |  | 1 |
| 4 | LA to Chicago |  |  |  | 2 |  |  | 2 |  | 3 | 2 |  | 3 |
| 5 | LA to SF | 2 |  |  |  |  | 3 |  |  |  | 5 | 5 |  |
| 6 | Chicago to Denver |  |  |  | 3 | 3 |  |  |  | 4 |  |  |  |
| 7 | Chicago to Seattle |  |  |  |  |  |  | 3 | 3 |  | 3 | 3 | 4 |
| 8 | Denver to SF |  | 2 |  | 4 | 4 |  |  |  | 5 |  |  |  |
| 9 | Denver to Chicago |  |  |  |  | 2 |  |  | 2 |  |  | 2 |  |
| 10 | Seattle to SF |  |  | 2 |  |  |  | 4 | 4 |  |  |  | 5 |
| 11 | Seattle to LA |  |  |  |  |  | 2 |  |  | 2 | 4 | 4 | 2 |
|  | **Cost $1000** | **2** | **3** | **4** | **6** | **7** | **5** | **7** | **8** | **9** | **9** | **8** | **9** |

Objective function: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

ST

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

11 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

12. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_