Problem 30

Hanson Inn is a 96-room hotel located near the airport and convention center in Louisville, Kentucky. When a convention or a special event is in town, Hanson increases its normal room rates and takes reservations based on a revenue management system. The Classic Corvette Owners Association scheduled its annual convention in Louisville for the first weekend in June. Hanson Inn agreed to make at least 50% of its rooms available for convention attendees at a special convention rate in order to be listed as a recommended hotel for the convention. Although the majority of attendees at the annual meeting typically request a Friday and Saturday two-night package, some attendees may select a Friday night only or a Saturday night only reservation. Customers not attending the convention may also request a Friday and Saturday two-night package, or make a Friday night only or Saturday night only reservation. Thus, six types of reservations are possible: convention customers/two-night package; convention customers/Friday night only; convention customers/Saturday night only; regular customers/two-night package; regular customers/Friday night only; and regular customers/Saturday night only.

The cost for each type of reservation is shown here.



The anticipated demand for each type of reservation is as follows:



Hanson Inn would like to determine how many rooms to make available for each type of reservation in order to maximize total revenue.

1. Define the decision variables and state the objective function

CT = number of convention two-night rooms

CF = number of convention Friday only rooms

CS = number of convention Saturday only rooms

RT = number of regular two-night rooms

RF = number of regular Friday only rooms

RS = number of regular Saturday only room

\_\_\_CT+\_\_\_CF+\_\_\_CS+\_\_\_\_RT+\_\_\_\_RF+\_\_\_\_RS

1. Formulate a linear programming model for this revenue management application.

\_\_\_CT+\_\_\_CF+\_\_\_CS+\_\_\_\_RT+\_\_\_\_RF+\_\_\_\_RS

s.t.

1) \_\_\_CT\_\_\_  
2) \_\_\_CF\_\_\_

3)\_\_\_CS\_\_\_

4) \_\_\_RT\_\_\_  
5)\_\_\_RF\_\_\_  
6)\_\_\_RS\_\_\_

7)\_\_\_CT+\_\_\_CF\_\_\_

8) \_\_\_CT+\_\_\_CS\_\_\_

9) \_\_\_CT+\_\_\_CF+\_\_\_RT+\_\_\_RF

10) \_\_\_CT+\_\_\_CS+\_\_\_RT+\_\_\_RS

C) What is the optimal allocation and the anticipated total revenue?

Variable Value

CT

CF

CS

RT

RF

RT

Total Revenue

d) Suppose that one week before the convention, the number of regular customers/Saturday night only rooms that were made available sell out. If another nonconvention customer calls and requests a Saturday only room, what is the value of accepting this additional reservation?

The shadow price for constraint 10 is ? and shows an added profit of ? if this additional reservation is accepted