The ROI Analysis needs to be done on all design options considered in a Feasibility Study.

Option 1: Stay with Current System

Background Information

Note: For this hypothetical example we have made up reasonable background numbers in order to perform the analysis. However, for your assignment, you should try and get as much of this information as possible from the real organization, (it's probably easier to ask simple questions than to try and make up reasonable numbers anyway).

Current Information - some facts

Discount rate: Here we use the discount rate from the lecture notes: 12%

Reminder: Present_value(n) = 1/(1 + i)^n where n = year, i = 0.12

Lifetime of System: 6 years

Definition: Hotel Customer: The occupants of a room are together considered as one "customer".

Error Frequency: On average one in every five customer checkouts results in a billing error.

- Half of these errors are over-billing errors, and we always assume that the hotel is honest and returns all over-billed money to the customers.
- Half of these errors are under-billing errors, and we always assume that the hotel does not pursue customers to correct under-billing errors, as the damage in customer satisfaction and hotel employee work load is not worth the potential money recovered.

Average Amount of Billing Error: $20 per customer

Current Number of Rooms in the Hotel: 50

Average Occupancy Rate: 60%

Check-ins/Check-outs: Each day 1/3 of customers check in, 1/3 of customers check out and 1/3 of customers remain unchanged.

Average Customer Charges (Room Cost + Extras) per Day: $100

Customer Loyalty Loss Due to Over-billing: Let's assume that the occupancy rate of the hotel would actually be 65% were it not for the loss of return customers due to overbilling.

Average Hotel Employee Wage: $15/hour

Average Time to Perform One Update: 2 hours

Updates per Day: 2

Expansion in Year 2

We assume that the hotel expansion corresponds with some sort of beneficial event, like a new tourist attraction, which would result in the occupancy rate remaining at 60%, even though the number of rooms are doubled (effectively the number of customers is then doubled by this new event).

New Number of Rooms: 100

Occupancy Rate: 60%

Average Time to Perform One Update: 4 hours

All other information remains the same.

Cost/Benefit Calculations

Current Situation

Average Billing Error/Customer:	$20 per customer/(1 in every 5 customers) = $2/customer
Average Number of Rooms Occupied per Day:	60% of 50 Rooms = 30 customers
Average Number of Checkouts per Day:	1/3 of 30 customers check out = 10 checkouts
Average Loss in Under-billing Errors Per Day:	10 checkouts * Average Billing Error/Customer $2 = $20
Yearly Loss from Under-billing Errors:	$20 * 365 = $7,300
Employee *Costs of Updates per year*:	2hrs/update * 2 updates per day * $15/hr wage *365 days = $21,900
Daily Costs of Over-billing:	Loss of 5% in occupancy * 50 rooms * $100 average room cost = $250
Yearly Costs of Over-billing:	$250 * 365 = $91,250
Total Yearly Current Costs of Current System:	$7,300 + $21,900 + $91,250 = $120,450

Expansion in Year 2

The number of rooms is doubled but the occupancy rate remains the same, thus average number of customers per day is doubled. Therefore the yearly loss from underbilling errors, and the daily cost of over-billing is simply doubled (conveniently). As the number of customers doubles, the time to perform updates doubles, therefore the Employee Costs of Updates per Year also doubles.

Yearly Loss from Under-billing:	$14,600
Yearly Loss from Over-billing:	$182,500
Employee Costs of Updates per Year:	$43,800

Total Yearly Costs of Expanded System:

Using this information now calculate:

1. Net Present Value

2. Payback Period

3. ROI

Option 2: Deploy New Automated System

For this option we are assuming the purchase of a customizable software system.

Background Information and Cost/Benefit Calculations

Two Separate Interconnected Systems:

Restaurant System:

Upfront Costs

Hardware and Software Costs:	$3,000
Upfront Customization Costs:	5 hours at $50/hour = $250
Training Costs for Hotel Employees:	5 hours of training * $15/hour = $75
Training Costs for Trainer:	5 hours of training * $50/hour = $250
Total Restaurant System Development Costs =	$3,575

Maintenance Costs per Year

Software Content Changes: average 1 hr/week * $50/hr * 52 weeks = $2,600

Front Desk/Management System

Upfront Costs

Hardware and Networking Costs (backup system included):	$20,000
Software:	$150,000
Software Customization:	$50,000
Pay TV Software Module Acquisition:	$5,000
Hotel Staff Training Costs:	50 hours * $15/hour = $750
Trainer Costs:	50 hours * $50/hour = $2,500
Total Front Desk/Management System Development Costs:	$228,250

Maintenance Costs per Year

Part-time Maintenance Person who does backups, training:	average 5 hrs/week * $50/hr * 52 weeks = $13,000
Software Changes:	average1hr/week * $100/hour * 52 weeks = $5,200
Total Yearly Maintenance Costs:	$5,200 + $13,000 = $18,200

Totals

Total System Development Costs	$228,250 + $3,575 = $231,825
Total Yearly Maintenance Costs	$18,200 + $2,600 = $20,800

Benefits

The benefits of the new system are equal to the costs of the old system, as the new system will correct all billing errors and eliminate the time needed to do manual updates.

Expansion in Year Two

As the system is designed to be (or purchased to be) completely expandable, there are no extra costs incurred during the Hotel expansion in year 2.

Using this information now calculate:

1. Net Present Value

2. Payback Period

3. ROI