CHAPTER 28: EXAMPLES OF PERFORMING SIMULATIONS ON SPREADSHEETS WITH CRYSTAL BALL

28.1.

(a) Answers will vary. A typical set of 5 runs: 46.49, 45.98, 45.76, 45.99, and 46.74.

(b) Answers will vary. A typical set of 5 runs: 46.13, 46.15, 46.42, 46.14, and 46.27.

(c) The mean completion times in (b) should be more consistent.

28.2.

(a) Triangular Distribution (Min = 293.51, Likeliest = 503.00, Max = 599.50)

(b) Min Extreme Distribution (Likeliest = 492.26, Scale = 56.34)

28.3.

(a) Uniform Distribution (Min = 299.27, Max = 498.73)

(b) Lognormal Distribution (Mean = 390.84, Standard Deviation = 59.91)

28.4.

	A	B	C	D	E	F	G	H	I
1							(all times in months)		
2							Start	Activity	Finish
3	Activity	Predecessor	Distribution	Parameters			Time	Time	Time
4	A Secure funding	—	Normal (mean, st. dev.)	6	1		0.0	6	6.0
5	B Design Building	A	Uniform (min, max)	6	10		6.0	8	14.0
6	C Site Preparation	A	Triangular (min, most likely,	1.5	2	2.5	6.0	2	8.0
7	D Foundation	B, C	Triangular (min, most likely,	1.5	2	3	14.0	2.1666667	16.2
8	E Framing	D	Triangular (min, most likely,	3	4	6	16.2	4.3333333	20.5
9	F Electrical	E	Triangular (min, most likely,	2	3	5	20.5	3.3333333	23.8
10	G Plumbing	E	Triangular (min, most likely,	3	4	5	20.5	4	24.5
11	H Walls and Roof	F, G	Triangular (min, most likely,	4	5	7	24.5	5.3333333	29.8
12	I Finish Work	H	Triangular (min, most likely,	5	6	7	29.8	6	35.8
13	J Landscaping	H	Fixed (5)				29.8	5	34.8
14									
15							Project Completion Time		34.8

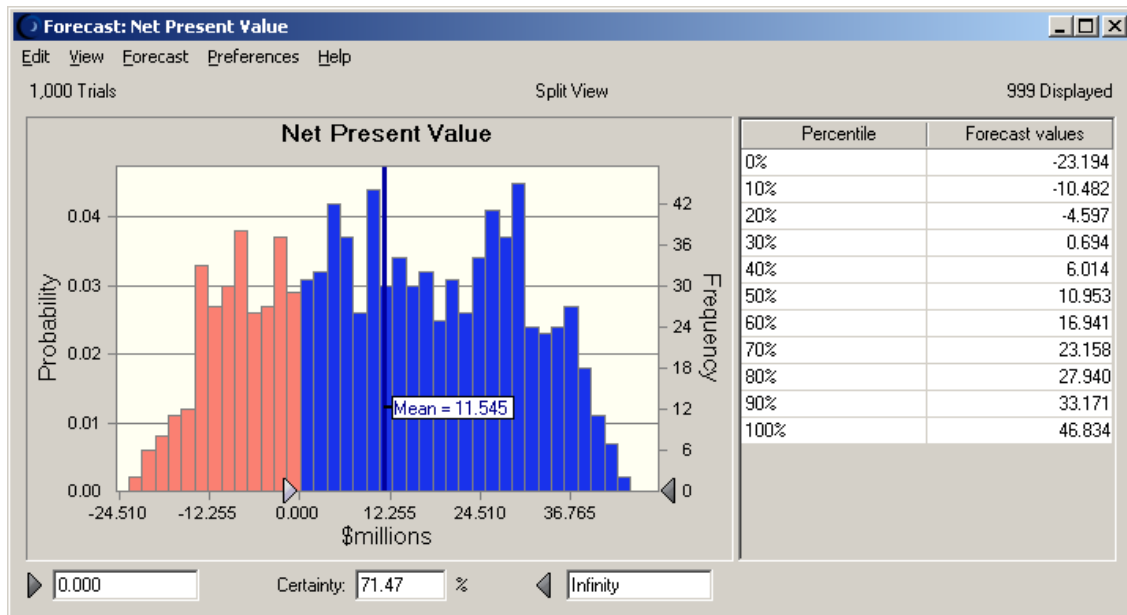(a) The mean project completion time is approximately 35 months.
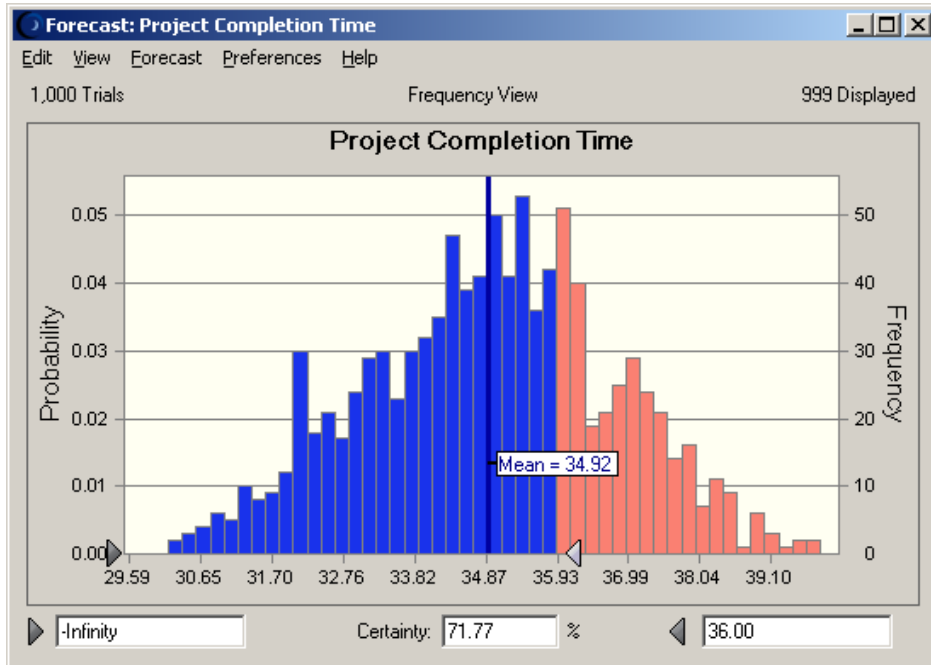
(b) The probability that the project completion time will be less than 36 months is approximately 71.8%.

(c) Activity A and Activity B have the largest impact on the variability of the project completion time.
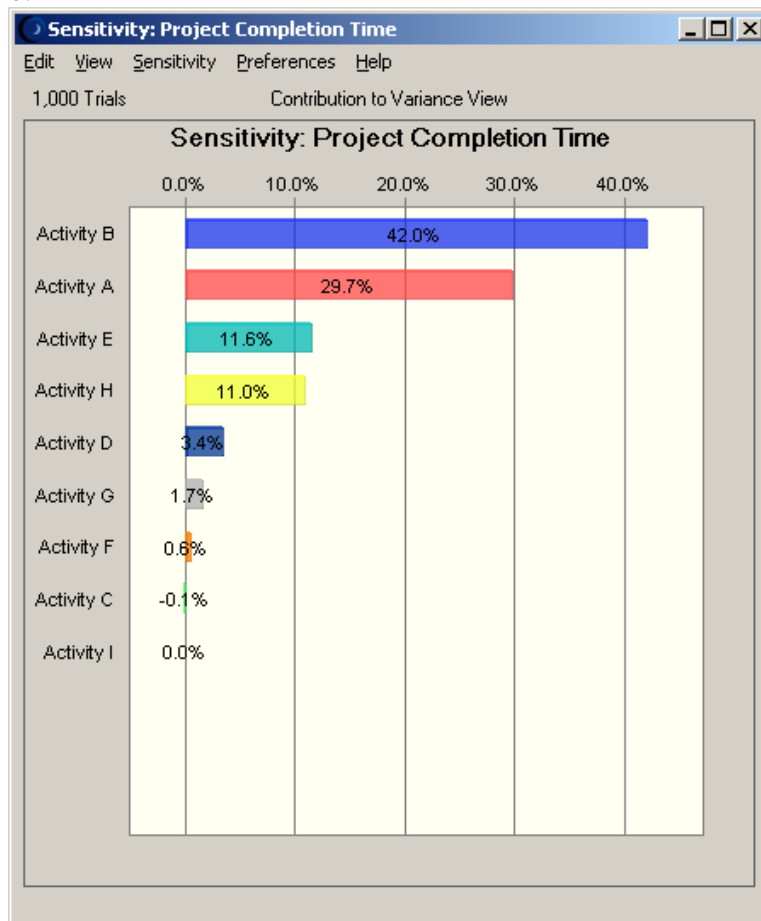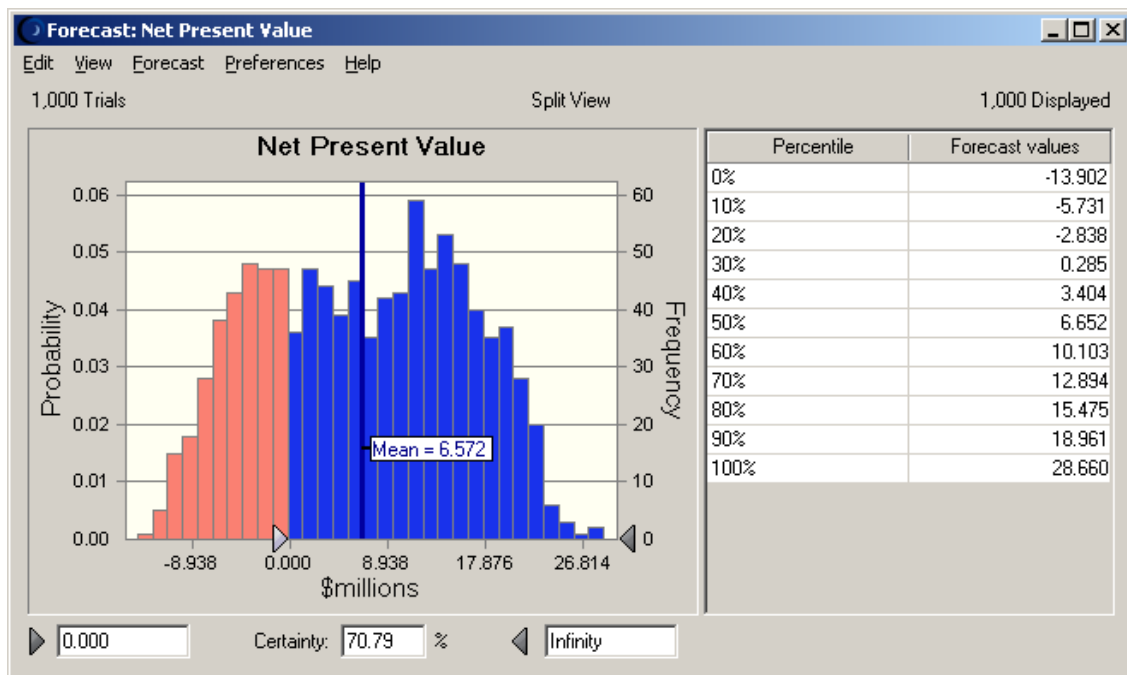
28.5.

(a) Option 2: Hotel Project Only


(b) Option 3: Shopping Center Project Only

(c) Option 1 appears to be the best. It has the highest expected NPV, $18 million whereas Option 2 has an expected NPV less than $12 million and Option 3 has an expected NPV less than $7 million. Moreover, there is less chance of losing money if one chooses Option 1. This probability is less than 20% for Option 1 while for the other options, it exceeds 25%.

28.6.

(a) A bid of approximately $5.3 million maximizes the mean profit.

OurBid (5.200)	OurBid (5.250)	OurBid (5.300)	OurBid (5.350)	OurBid (5.400)	OurBid (5.450)	OurBid (5.500)	OurBid (5.550)	OurBid (5.600)
0.473	0.486	0.489	0.488	0.480	0.463	0.392	0.311	0.241

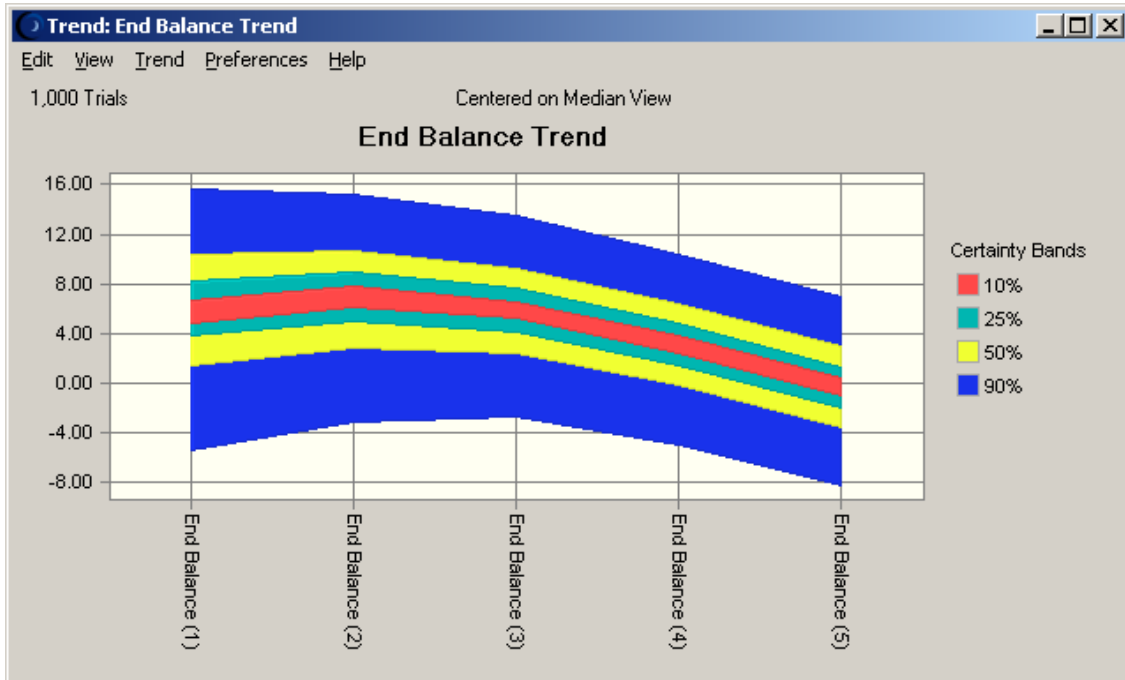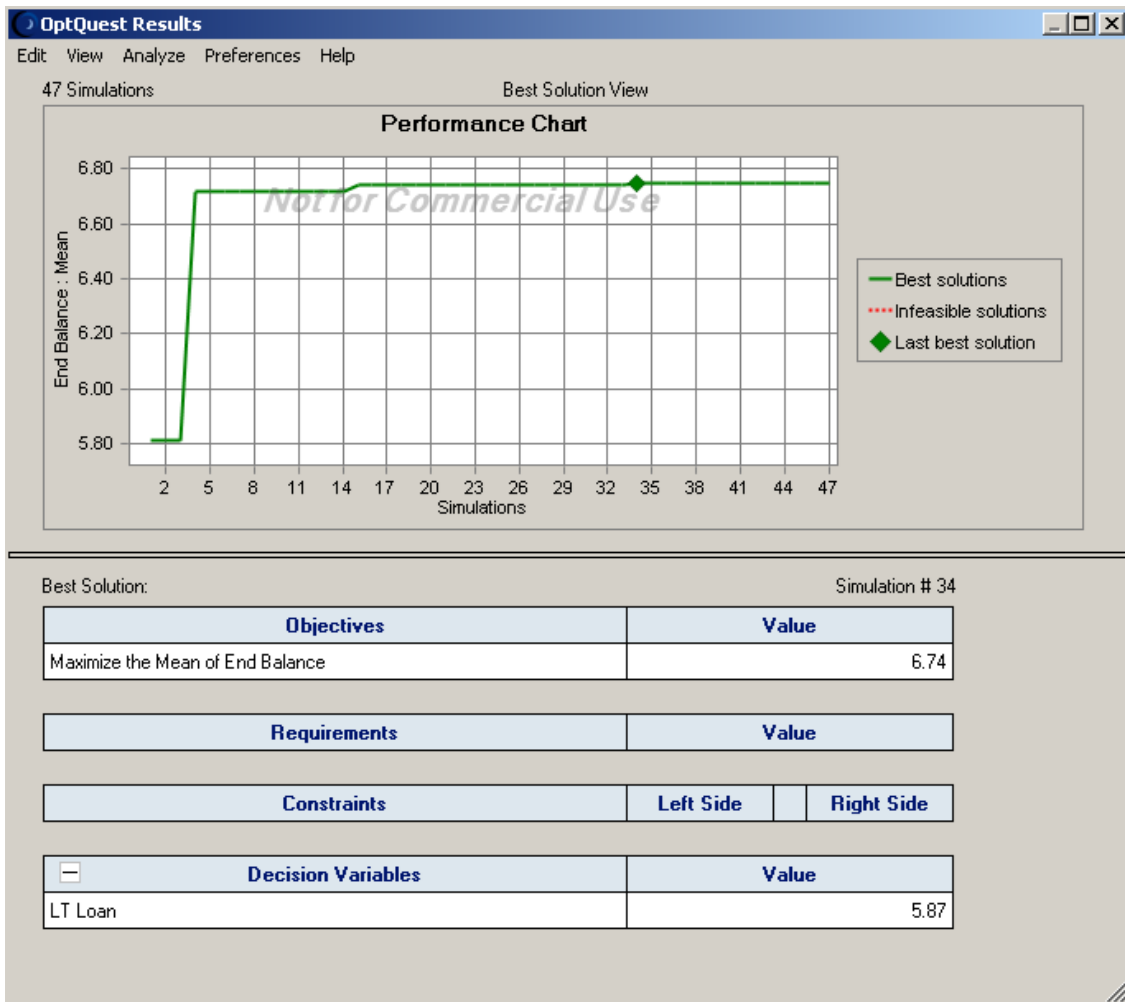(b) The optimal bid is approximately $5.305 million, as found by OptQuest.
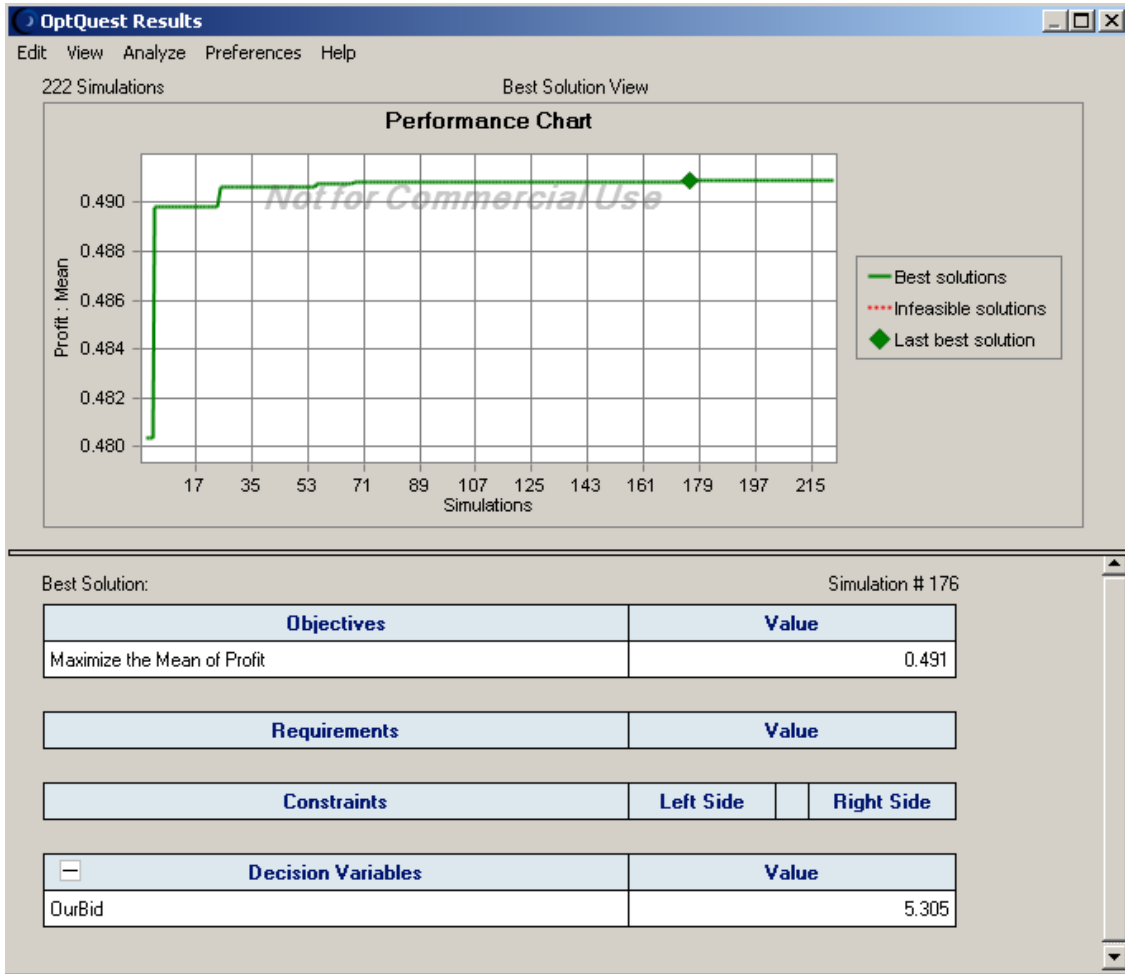
28.7.

(a) A long-term loan of approximately $5 million maximizes Everglade's mean ending balance.

LT Loan (0.00)	LT Loan (5.00)	LT Loan (10.00)	LT Loan (15.00)	LT Loan (20.00)
5.73	6.72	5.82	3.07	-0.33

(b)

(c) The optimal long-term loan is approximately $5.87 million, as found by OptQuest.

28.8.

(a) Accepting approximately 185 reservations maximizes the mean profit.

ReservationsToAccept (180)	ReservationsToAccept (181)	ReservationsToAccept (182)	ReservationsToAccept (183)	ReservationsToAccept (184)	ReservationsToAccept (185)	ReservationsToAccept (186)	ReservationsToAccept (187)	ReservationsToAccept (188)	ReservationsToAccept (189)	ReservationsToAccept (190)
$6,613	$6,719	$6,803	$6,869	$6,908	$6,926	$6,924	$6,894	$6,841	$6,777	$6,693

(b)

28-6
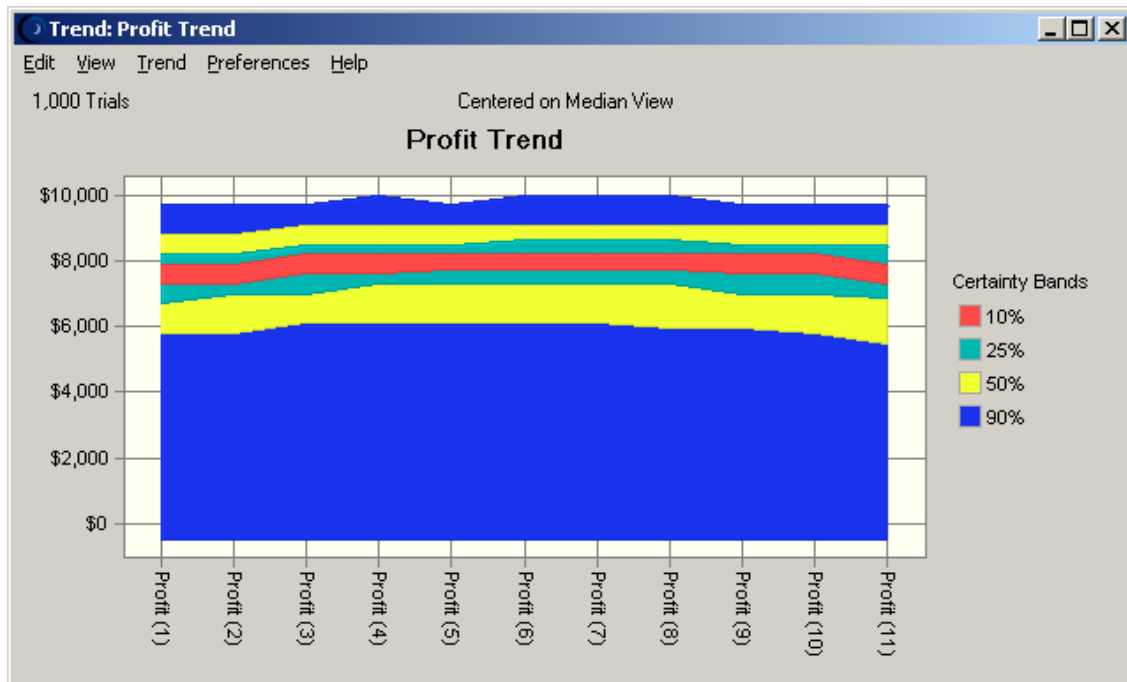
(c) The optimal number of reservations to accept is approximately 185, as found by OptQuest.