



Decision Sciences Department

Project Management Program

Semester: Summer 2014
Course Title: Project Planning and Scheduling DNSC267
Instructor: Prof. H. Khamooshi
Assignment: GSA: Group Semester Assignment
Submission : One submission per group

Due by 11:59pm ET on Monday, July 28, 2014.

Your work should be submitted as a single PDF file using the Assignments tool in Blackboard.

File Naming Convention: The file name must be CASE2_GroupName.pdf.

The project management software file, for example MSP file if you used Microsoft Project must be posted at the same time as well.

CASE 2: Palm Beach Country Club Condos

ABC Construction is building the new Palm Beach Country Club Villas project, consisting of 18 buildings, each housing 12 condominiums. Each building will border the Palm Beach Golf Course designed by J. M. Architects. The minimum price for a condominium unit is \$275,000, and buyers expect a high-quality project. Response to the initial promotion was so great that ABC Construction pre-sold all 216 units based solely on an architect's conception and schematic plans of the project. One reason for the quick sell-out may have been the -YOU CAN MOVE IN BY SUMMER-campaign. As part of this campaign, ABC promised rebates of \$10,000 cash to all 216 buyers if all the facilities, buildings, and other amenities were not completed by June 15 of next year. As of September 14, the project is well underway. The following PERT/CPM network data in Table 1 details the precedence relationship and duration estimates for activities of the tasks remaining to be completed in the project.

All tasks except for activity R, the underground sewer activity, and activity T, the stream building activity, have been assigned to the appropriate subcontractors. Three time estimates (in days) for each of the other activities have been determined and are given in the Table 1. Table 2 provides the same information developed using USM modelling approach/methodology.

ACTIVITY CODE AND DESCRIPTION	Estimated Activity Duration (a ,m,b)			Dependencies
	optimistic	most likely	pessimistic	
A. Land measurements	5	8	15	-
B. Layout of measurement stakes	7	12	20	A
C. Analysis of surrounding environment	10	17	31	A
D. Building of foundation	12	22	38	B
E. Approval of construction papers	6	13	21	C

<i>F. Layout of building framework</i>	<i>11</i>	<i>15</i>	<i>27</i>	<i>C</i>
<i>G. Gas line instalment</i>	<i>9</i>	<i>18</i>	<i>22</i>	<i>C</i>
<i>H. Electrical wiring</i>	<i>25</i>	<i>27</i>	<i>31</i>	<i>B,G</i>
<i>I. Interior plumbing</i>	<i>18</i>	<i>20</i>	<i>35</i>	<i>E,B</i>
<i>J. Wall construction</i>	<i>12</i>	<i>25</i>	<i>32</i>	<i>D,H</i>
<i>K. Insulation</i>	<i>10</i>	<i>23</i>	<i>33</i>	<i>I,F</i>
<i>L. Drywall</i>	<i>15</i>	<i>20</i>	<i>25</i>	<i>F,I</i>
<i>M. Roofing</i>	<i>3</i>	<i>10</i>	<i>20</i>	<i>K,J</i>
<i>N. Restaurant construction</i>	<i>25</i>	<i>40</i>	<i>55</i>	<i>G</i>
<i>O. Swimming pool</i>	<i>9</i>	<i>20</i>	<i>40</i>	<i>J,K,L,G</i>
<i>P. Fencing</i>	<i>6</i>	<i>10</i>	<i>21</i>	<i>J,K,L,G</i>
<i>Q. Telephone lines</i>	<i>12</i>	<i>22</i>	<i>40</i>	<i>M,O</i>
<i>R. Completion of underground</i>				<i>M,O</i>
<i>S. Snack bar</i>	<i>10</i>	<i>20</i>	<i>30</i>	<i>N</i>
<i>T. Stream building</i>				<i>N</i>
<i>U. Outside lighting</i>	<i>8</i>	<i>12</i>	<i>15</i>	<i>P,S</i>
<i>V. Parking lots</i>	<i>3</i>	<i>5</i>	<i>7</i>	<i>P,S,Q,</i>
<i>W. Drainage construction</i>	<i>5</i>	<i>10</i>	<i>18</i>	<i>P,S,Q,T</i>
<i>X. Safety inspection</i>	<i>9</i>	<i>15</i>	<i>25</i>	<i>U,W</i>
<i>Y. Landscaping</i>	<i>6</i>	<i>24</i>	<i>40</i>	<i>R,V</i>
<i>Z. Final permits/releases</i>	<i>10</i>	<i>15</i>	<i>25</i>	<i>X,Y</i>

ACTIVITY CODE AND DESCRIPTION	Estimated Activity Duration (a ,m,b)			Dependencies
	Reliability	most likely	pessimistic	
A. Land measurements	90	8	15	-
B. Layout of measurement stakes	80	12	20	A
C. Analysis of surrounding environment	90	17	31	A
D. Building of foundation	75	22	38	B
E. Approval of construction papers	70	13	21	C
F. Layout of building framework	90	15	27	C
G. Gas line instalment	85	18	22	C
H. Electrical wiring	75	27	31	B,G
I. Interior plumbing	85	20	35	E,B
J. Wall construction	90	25	32	D,H
K. Insulation	90	23	33	I,F
L. Drywall	90	20	25	F,I
M. Roofing	80	10	20	K,J
N. Restaurant construction	70	40	55	G
O. Swimming pool	80	20	40	J,K,L,G
P. Fencing	90	10	21	J,K,L,G
Q. Telephone lines	90	22	40	M,O
R. Completion of underground	80			M,O
S. Snack bar	90	20	30	N
T. Stream building	80			N
U. Outside lighting	80	12	15	P,S

<i>V. Parking lots</i>	<i>90</i>	<i>5</i>	<i>7</i>	<i>P,S,Q,</i>
<i>W. Drainage construction</i>	<i>70</i>	<i>10</i>	<i>18</i>	<i>P,S,Q,T</i>
<i>X. Safety inspection</i>	<i>70</i>	<i>15</i>	<i>25</i>	<i>U,W</i>
<i>Y. Landscaping</i>	<i>90</i>	<i>24</i>	<i>40</i>	<i>R,V</i>
<i>Z. Final permits/releases</i>	<i>60</i>	<i>15</i>	<i>25</i>	<i>X,Y</i>

Activity R, the underground sewer activity, consists of installing pipes and connections to join all 18 buildings to the main city sewer system. ABC Construction has two alternatives for this activity:

1. Reedy Brothers has submitted a bid of \$300,000 for the design and construction of the required sewer project. It estimates a most likely completion time of 25 days, with a difference of plus or minus two days for the optimistic and pessimistic time estimates.
2. ABC can design the sewer project itself and hire another company, Paramount Construction, to build the system according to ABC's specifications. Paramount will charge ABC \$20 per foot of sewer built. Paramount estimates that it can build between 200 and 360 feet of sewers per day; its most likely estimate is 300 feet per day. To minimize disruption to the aesthetic beauty of the project, sewers will run underneath the paths between condominium buildings.

Activity T, the stream building activity, involves building a stream that runs throughout the project and connects the western and eastern boundaries. Again ABC has two alternatives:

1. ABC has received a bid of \$400,000 from Lakepro, Inc. to design and build a meandering stream that will most likely be finished in 30 days, give or take five days.
2. ABC can design and direct the stream construction. The actual work will be performed by the Oberlin Company, at a price of \$50 per foot. Oberlin estimates that it will take a full day to complete 60 feet on the stream project. Since ABC would like to conserve costs, if it designs the stream, it will have the minimal distance and parallel paths between the condominium buildings. ABC estimates that overall completion time for this activity will be no more than 10 days longer or less than 10 days shorter than the Oberlin estimate.

Attached is a map of the feasible pathways between the condominium buildings and a table showing the distance between the buildings which may be used for sewer construction or stream construction:

Assume that today is September 14, 2014, and that all work is to be done on a five-day-per-week basis including holiday periods. Prepare a report for Calico Construction using all you tools and techniques in your disposal to address the followings:

Part A

A0. A very brief PID (Project Initiation Document)

- A1. Develop tentative target start and completion dates for each activity
- A2. Recommend which alternative to select for the sewer activity
- A3. Recommend which alternative to select for the stream activity
- A4. Estimate the total expected cost for the two contractors selected for the sewer and stream activities

Part B

For this part (answering B5 and B6) use three different approaches /tools given below:

Part B-1 PERT analysis

Use the given three time estimates in the table above.

Part B-2 Simulation analysis

Assume each activity follows a beta distribution using the same a, m and b.

Part B-3 USM (Khamooshi-Cioffi) analysis

Assume binomial distribution for each task using “m” as minimum and b as maximum and potential risk equal to b-m.

- B5. Give a dates by which you are 75, 90 and 99% sure that the entire project will be completed
- B6. Recommend whether to spend \$25,000 for additional legal assistance that would reduce the most likely time to attain the final permits and releases (activity Z) from 15 to 12 days and its pessimistic time from 25 to 18 days.

Part C

Assuming the project requires many resources but only A, B , C and D are critical resources, costing 40,30,20 and 10\$ per day, develop an optimal budget and schedule assuming the planned duration for each task is set to be m (mode, most likely value) for each task given in the table 2.

N.B. As per strategic objective of the company there is no resource limit imposed on the planning department.

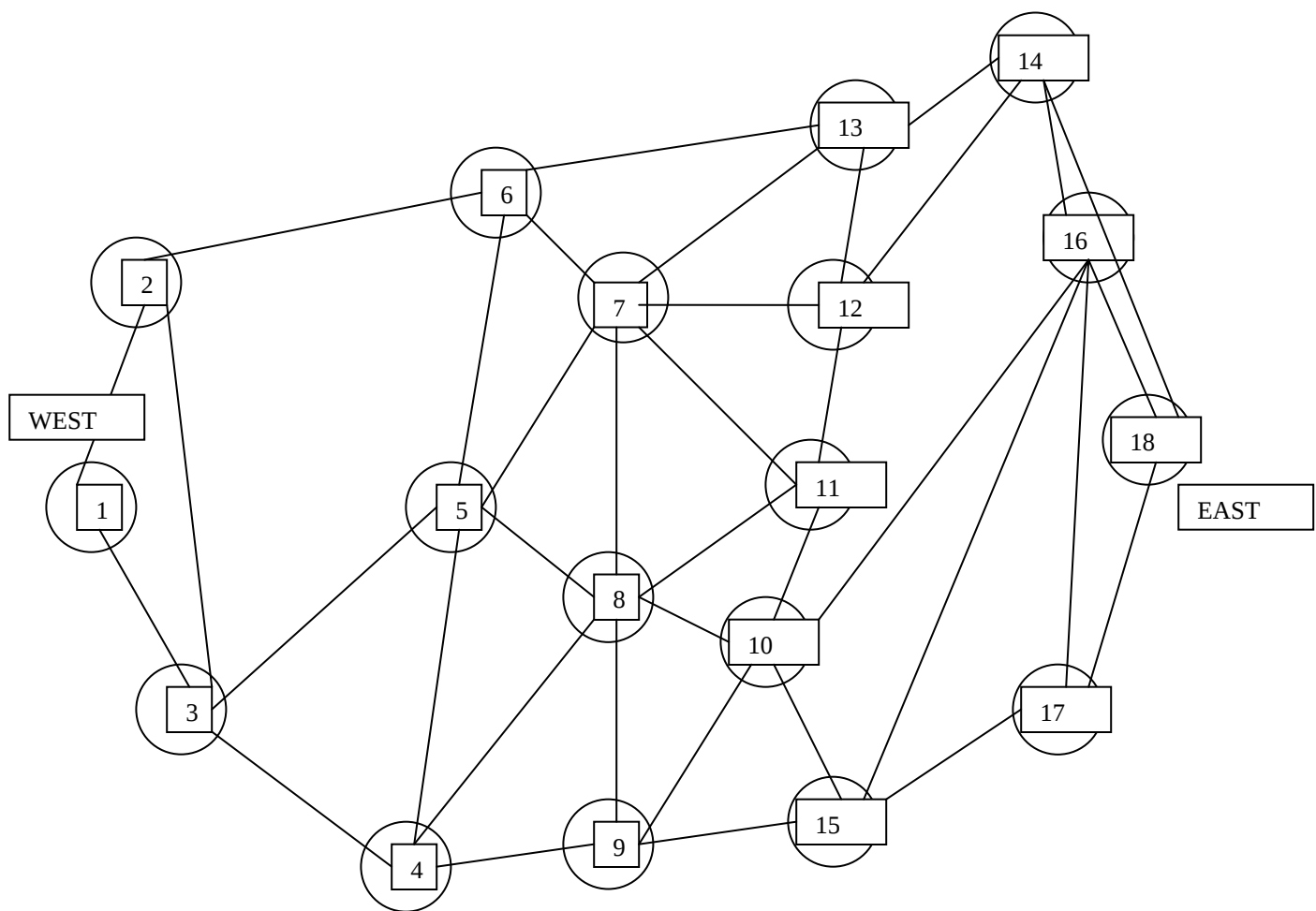
- C7. Analyse the proposed project plan from planning perspective and identify pros and cons of your recommended project plan addressing and discussing risk associated with uncertainty and needed contingencies.

ACTIVITY CODE AND DESCRIPTION	Resource A	Resource B	Resource C	Resource D
A. Land measurements	2	1	3	1
B. Layout of measurement stakes	2	3	3	1
C. Analysis of surrounding environment	2	2	2	1
D. Building of foundation	3	1	3	1
E. Approval of construction papers	2	3	3	1
F. Layout of building framework	2	1	3	2
G. Gas line instalment	1	2	3	1
H. Electrical wiring	1	1	2	2
I. Interior plumbing	2	1	0	1
J. Wall construction	2	2	2	2
K. Insulation	2	1	0	1
L. Drywall	2	3	2	1
M. Roofing	2	2	3	1
N. Restaurant construction	2	1	2	1
O. Swimming pool	2	2	3	1
P. Fencing	2	1	3	1
Q. Telephone lines	4	1	0	1
R. Completion of underground	2	1	3	1
S. Snack bar	2	0	3	1
T. Stream building	2	1	2	1

<i>U. Outside lighting</i>	<i>2</i>	<i>1</i>	<i>3</i>	<i>1</i>
<i>V. Parking lots</i>	<i>2</i>	<i>4</i>	<i>1</i>	<i>1</i>
<i>W. Drainage construction</i>	<i>2</i>	<i>1</i>	<i>3</i>	<i>1</i>
<i>X. Safety inspection</i>	<i>2</i>	<i>0</i>	<i>3</i>	<i>1</i>
<i>Y. Landscaping</i>	<i>2</i>	<i>2</i>	<i>3</i>	<i>1</i>
<i>Z. Final permits/releases</i>	<i>2</i>	<i>1</i>	<i>3</i>	<i>1</i>

Source:

Lawrence & Pasternack, Applied Management Science, Wiley
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Figure 1: Map of feasible pathway between the condos which may be used for sewer or stream construction.

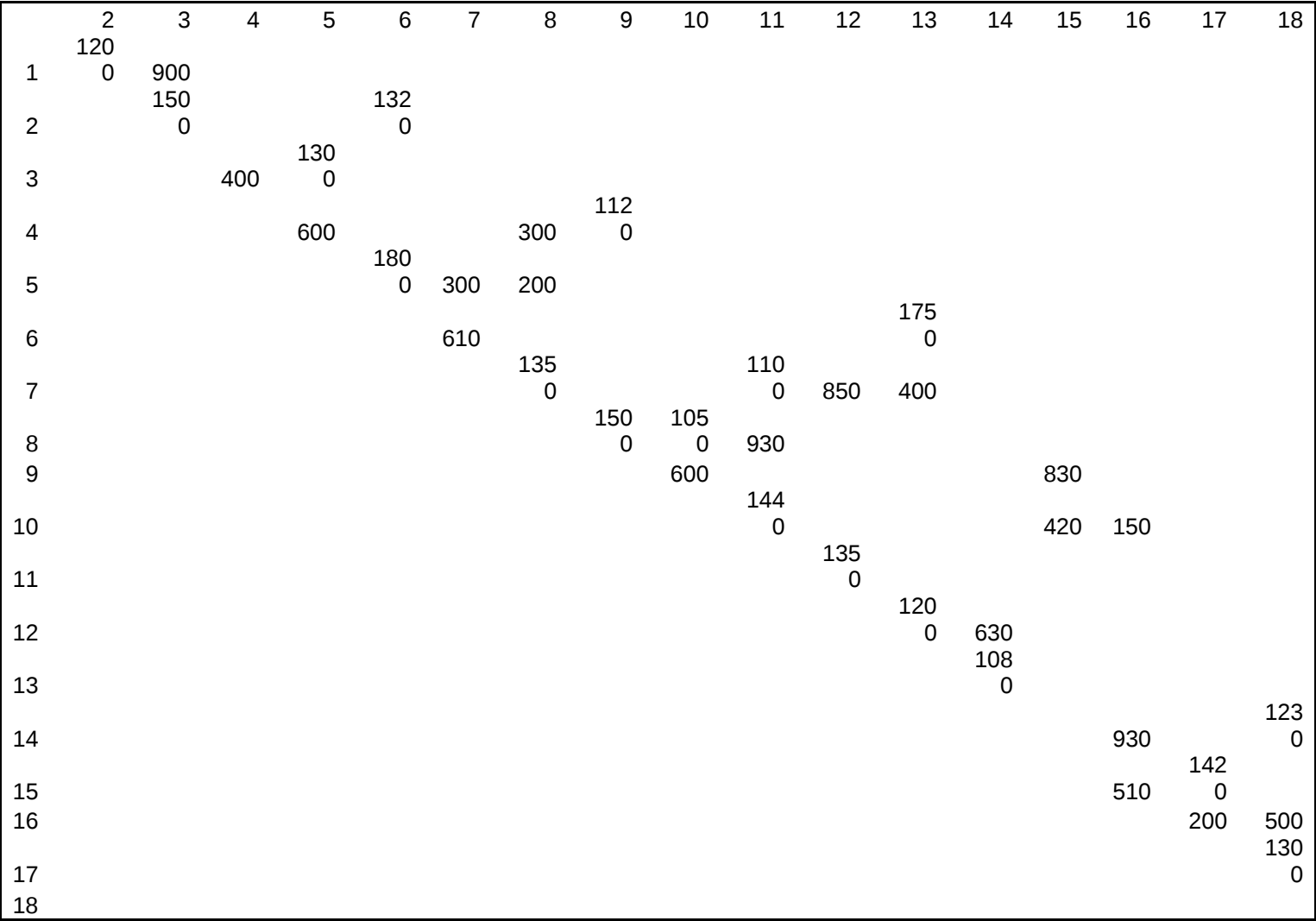


Figure 2: Distance between the buildings