CE 631: Simulation and IT Applications in Construction
Semester 1 - 2024

Test
Time: 1 Week

Question # 1: Take Home

Date: November 18, 2024 at 11:30 am

(3 pages including cover sheet)

Include this questions booklet to your answer booklet and submit them online on or before Monday, November 25, 2024, at 8:30am

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Problem No. 1: (**Assume any missing information**) Name: PANZhiqing

Conduct a simulation of the precast concrete element plant modeled as attached. Assume that each batch results in the production of 2 concrete elements. Assume that the use of each form costs $1,000/day. Assume that the daily (8-hour shift) cost of each additional crew is $800. In the range of 2 to 5 crews and for 2, 4, 6, and 8 forms, using sensitivity analysis, determine which system will produce the optimum cost/element (i.e., minimum cost/unit). Data are given in the following tables.

Table 1: System Time Attributes

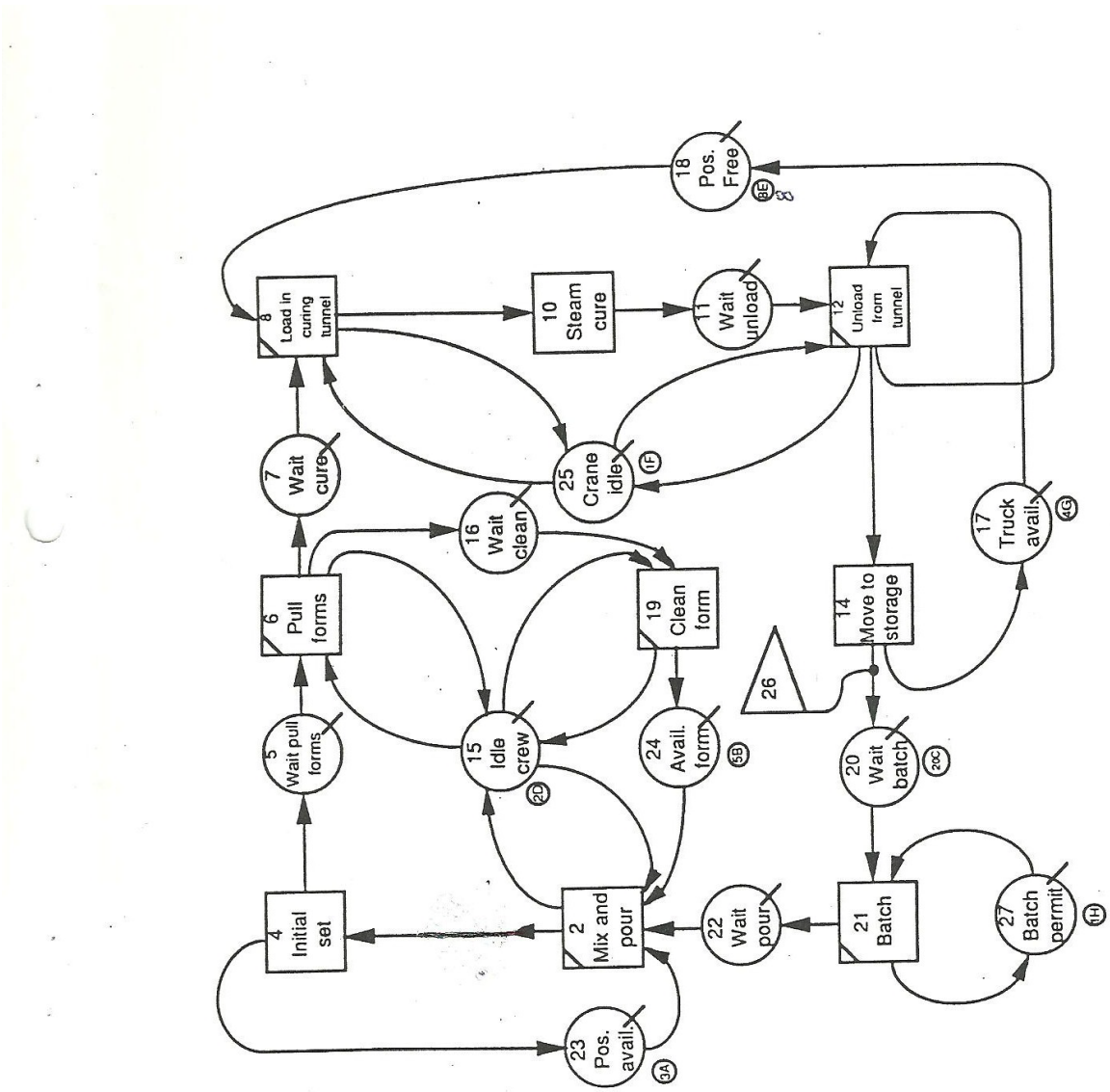
Element Number	Distribution	Set Number	Mean	Lower Bound	Upper Bound	Standard Deviation
2	Normal	2	40	30	60	8
4	Constant	3	150	-	-	-
6	Constant	4	30	-	-	-
8	Normal	5	35	18	52	7
10	Constant	6	400	-	-	-
12	Normal	5	25	14	42	5
14	Normal	7	45	20	64	8.5
19	Normal	8	65	37	83	20
21	Normal	9	38	19	57	8

Table 2: Ingredience-Constrained Work Tasks

Ingredient	Activities				
	2 Mix and pour	**6 Pull Forms**	**8 Load in Curing Tunnel**	**12 Unload form Tunnel**	**19 Clean Form**
1	Crew at 15	Batch and form at 5	Batch at 7	Batch at 11	Crew at 15
2	Batch at 22	Crew at 15	Cure position at 18	Truck at 17	Form at 16
3	Set position at 23		Crane at 25	Crane at 25	
4	Form at 24				

Questions:

a) Develop EzStrobe and AnyLogic models to simulate the attached precast concrete model.
b) Run the models to determine the average precast concrete element's production.
c) Generate complete sets of reports from both programs.
d) Select the best alternative.



Precast concrete element plant.