UNIVERSITÄT MANNHEIM
BETRIEBSWIRTSCHAFTSLEHRE

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„IS 510 Process Management“

Name and first name:	_____
Course of study:	_____
Final degree:	Master □ Diploma □ Bachelor □ Other □
Stud.-#:	_____
Room and place#:	_____
Signature:	_____

Important remarks:

- The exam assignment is provided in English!
- You may answer in English **or** German!
- Select **one task out of two!**
- Time budget: **60 minutes (+ 5 minutes reading)**
- Please acknowledge time budget distribution over questions as indicated!
- Auxiliary devices: anything, except notebook computers, PDAs, cell/smart phones or smart watches

Task 1

The FROST Health Facility, a small-sized company, specialized in the conservation of organic material, has hired you to analyze one of their processes. You are tasked with the blood donation process. When donors arrive, the assistant at the reception checks whether the donor is registered in the CRM system or not. In case that the donor is new, his data is entered into the CRM system. The system automatically checks if the information about the donor contains any known diseases which make the donation process too risky for him or her. If such diseases are found, the donor is excluded from the donation process. If this is not the case, the donor is treated like previously registered donors. In the next step, patients are brought to the doctor. The doctor checks the current health status of the patient while an assistant prepares the blood withdrawal. Then the actual blood withdrawal is conducted. After the withdrawal, the blood bottle is tagged with an id and then registered in an ERP system. Now the donor gets escorted to a relaxation room where he can eat cake and/or have a drink. When the donor feels ready, he or she leaves the FROST Health Facility.

a) Model this process as an extended EPC (eEPC) according to existing eEPC rules. Please include information objects, organizational units and application systems if applicable.

(20 minutes)

b) Transform the designed eEPC into a P/T Net according to existing design rules.

(20 minutes)

c) Based on your solutions in the previous subtasks, demonstrate the advantages and disadvantages of eEPCs and P/T Nets.

(20 minutes)

Good luck!

Task 2

The FROST Health Facility (FHF), a small-sized company, specialized in the conservation of organic material, has hired you to analyze one of their processes. You are tasked with the blood and blood plasma donation process. During the 10 hours when the facility is open, an assistant at the reception awaits donors. These arrive equally distributed between 8 and 12 minutes apart at the facility (FHF). The assistant (ASSIST) needs between 7 and 13 minutes (equally distributed) to inform the donor about risks during the donation process and to enter his or her data into the system. Fifteen percent (15%) of all donors are rejected after the interview and leave the facility directly. The remaining donors are examined by the doctor (DOC). The doctor needs between 7 and 11 minutes (equally distributed) to examine a donor. After the examination, the donors go to the extraction room. 60% of all donors donate blood, the remaining ones donate blood plasma. In the extraction room are three (3) blood donation stations (BDS) and two (2) blood plasma donation stations (BPDS), which can be used in parallel. As each station has its own medical assistant , the only possible bottleneck here is the amount of available stations. The blood extraction process takes between 20 and 30 minutes (equally distributed). The blood plasma extraction process takes between 35 and 45 minutes (equally distributed). After the respective extraction process, donors leave the FROST Health Facility and the process is completed.

a) Model this situation as a GPSS model that has all details about the waiting queue at the reception and the time that donators spend in the process as output. Please use the names in brackets as identifiers for the modeling symbols. If you use ENTER + LEAVE Blocks, make clear how high their capacity is.

(20 minutes)

b) Your GPSS program has yielded the following results:

Result: Stations

Facility	(1) Average utilization	(2) Number of entries	(3) Average time/trans
ASSIST	97.26	60	9.73
DOC	67.76	45	9.03

Storage	(1) Capacity	(2) Average contents	(3) Average utilization	(4) Entries	(5) Average time/trans
BDS	3	1.45	48.17	34	25.50
BPDS	2	0.63	31.33	10	37.60

Storage	(6) Current contents	(7) Maximum contents
BDS	1	3
BPDS	1	2

Result: Queue/AD

Queue or AD set	(1) Maximum contents	(2) Average contents	(3) Total entries	(4) Zero entries	(5) Percent zeros
FHF	8	4.33	60	0	0.00
ASSIST	2	0.56	60	9	15.00

Queue or AD set	(6) Average time/trans	(7) $Average time/trans	(8) Current contents
FHF	43.33	43.33	5
ASSIST	5.55	6.53	0

$Average time/trans=average time/trans excluding zero entries

Result: Tables

Table FHF

(1) Entries	(2) Mean AD set time	(3) St. dev.	(4) Total time	(5) Minimum	(6) Maximum
55	45.36	18.97	2494.81	9.01	84.02

Range	Observed frequency	Per cent of total	Cumulative percentage	Cumulative remainder
- 20	13	23.64	23.64	76.36
20.01 - 30	0	0.00	23.64	76.36
30.01 - 40	0	0.00	23.64	76.36
40.01 - 50	13	23.64	47.27	52.73
50.01 - 60	19	34.55	81.82	18.18
Overflow	10	18.18	100.00	0.00

(7) Average value of overflow 66.41

The general manager wants to know what to expect from their current donation process and would like to have following questions answered:

1. How many donors completed the process during work hours? (including those who got rejected)
2. How many donors spent more than 40 minutes and up to 60 minutes in this process?
3. What was the mean time to fully process a donation request?
4. How many donors arrived during work hours?
5. What was the minimum time a donor spent in the process? Can you prove that he got rejected and did not donate blood or blood plasma? How?
6. Give two reasons why the average utilization of the doctor is lower than the average utilization of his assistant.
7. How can the total processing speed of requests be increased? How can this be modeled in GPSS? Describe two suggestions.
8. Would you recommend the general manager to buy more blood and blood plasma donation stations? Explain your decision!

(20 minutes)

c) You were hired by a small company with eight employees, which currently runs all their processes paper based without tracking individual process steps. The general manager has contacted you and showed his interest in process mining.
   1. Please give him a short introduction into the different types of process mining.
   2. The general manager wants to know the general benefits of process-mining techniques and their drawbacks. Please elaborate!
   3. Which steps have to be completed by the company before they can start with process mining? Explain!
   4. Would you recommend the company to follow a process mining approach? Please explain why or why not!

(20 minutes)

Good luck!