National University of Computer and Emerging Sciences, Lahore Campus

	Course:	**Software Engineering**	**Course Code:**	**CS303**
	Program:	**BS (CS)**	**Semester:**	**Fall 2016**
	Duration:	**60 Minutes**	**Total Marks:**	**40**
	Paper Date:	**14-Nov-16**	**Weight**	**15%**
	Section:	**ALL**	**Page(s):**	**3**
	Exam:	**Sessional II**		

Instruction/Notes:

1. A single-sided, hand-written, A4-size help sheet is allowed.
2. Focus on your own question paper. Don't look here and there.
3. Attempt all questions on the question paper. Neither use nor submit any extra sheet.

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Question 1 (Max. Marks = 20)

The blood bank testing unit (BBTU) is responsible for receiving, testing, storing, and supplying blood samples. After receiving a blood sample, BBTU tests for blood type (e.g. A +ve, O -ve, etc.). Then, it checks for the presence of diseases (e.g. Hepatitis, AIDS, etc.) in the blood sample. If a disease is detected, BBTU destroys the blood sample. If the blood sample does not contain any disease, BBTU assigns it a unique serial number and stores it in the refrigerator. The serial number and other information related to this blood sample - blood type, date received, amount (in ml) - are then forwarded to the Processing Office. Blood samples have a limited shelf-life. Samples exceeding their shelf-life expire and need to be destroyed. Every day, the BBTU receives a list of expired samples (identified by their serial numbers) from the Processing Office. These expired blood samples are destroyed by the BBTU and a confirmation (of destruction) is sent back to the Processing Office. A hospital in need of blood of a specific type sends a request to the BBTU specifying the type and amount of blood required. The BBTU checks whether this hospital is one of its members or not by looking at its membership file. If the hospital is not a member, the BBTU sends it a membership application form. If the hospital is a member, the BBTU checks the stock of blood samples in the refrigerator. If the required type and amount of blood is unavailable, the BBTU generates a notification of regret and sends it to the hospital. Otherwise, the required blood is donated to the hospital (after removing it from the refrigerator) and a stock update notification is sent to the Processing Office.

Use ONLY the information provided above, to draw (on the next page i.e. page 2) levels 0 and 1 of a data flow diagram (DFD) modeling the BBTU.

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DFD Level 0

DFD Level 1

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Question 2 (Max. Marks = 20)

The following diagram shows the complete lowest level DFD of a point of sale system. Use structured design to derive the call-and-return program architecture from this DFD. Design heuristics should be used to produce the final (i.e. most refined) architecture.

The following information should be used for mapping:

- 3 Transform centers: ‘e’ and ‘f’ (together); ‘k’; 'n'; ‘q’.
- 1 Transaction center: ‘i’.