



National University of Computer & Emerging Sciences, Karachi
Spring-2018 CS-Department
MidTerm 2
4th April 2018, 09:00 am – 10:00 am



Course Code: CS402	Course Name: Compiler Construction
Instructor Name / Names: M. Shahzad	

Instructions:

- Return the question paper.
- Read each question completely before answering it. There are **3 questions and 2 pages**.
- In case of any ambiguity, you may make assumption. But your assumption should not contradict any statement in the question paper.
- All the answers must be solved according to the sequence given in the question paper.
- This paper is subjective. All the questions should be attempted on the answer sheet.
- All questions carry equal marks and equally distributed in sub parts.

Time: 60 minutes.

Max Marks: 30 points

Question 1 (10 points = 2 * 5):

Provide 2-3 line replies to all of the following short questions. Answer that exceeds 3 lines will not be considered.

- 1) Describe the relationship between a production and an item in an LR(0) grammar. [2 points]
- 2) What are the error handling mechanisms in parsing phase? [2 points]
- 3) Demonstrate stack implementation in implementation of shift reduce Parsing. [2 points]
- 4) What are the requirements of the grammar to be in LL(1) grammar? [2 points]
- 5) Explain the limitation of the recursive descent parsing. [2 points]

Question 2 (10 points = 2 * 5):

Consider the following grammar H (the different productions have been numbered):

1. $S \rightarrow [SX]$	$[] \rightarrow + ; - , b, J, c, \epsilon$
2. $S \rightarrow a$	$a \rightarrow a$
3. $X \rightarrow \epsilon$	$\epsilon \rightarrow \epsilon$
4. $X \rightarrow +SY$	$+ \rightarrow +$
5. $X \rightarrow Yb$	$b \rightarrow -1b$
6. $Y \rightarrow \epsilon$	$\epsilon \rightarrow \epsilon$
7. $Y \rightarrow -SXc$	$- \rightarrow -$

It contains 3 non-terminals S, X and Y, along with terminals [], a, b, c, +, - and ϵ .

$$\begin{aligned}S &\rightarrow [, a \\X &\rightarrow + , - , b , \epsilon \\Y &\rightarrow - , \epsilon\end{aligned}$$

1 of 2

a) Fill in the table below with the First and Follow sets for the non-terminals in this grammar [5 points]

	FIRST	FOLLOW
S	C, a	
X	+ - , b, e	
Y	- , e	

b) Fill in the parse table below for the grammar H (don't write the productions inside the table; write only their numbers as given above) [5 points]

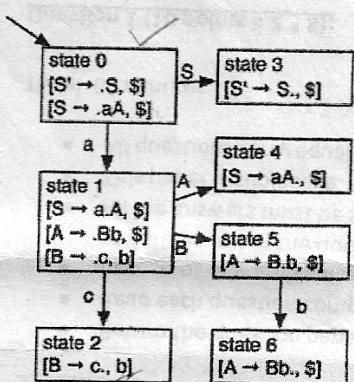
	a	b	c	+	-	[]	\$
S								
X								
Y								

Question 3 (10 points = 2* 5):

a) Draw the LR(1) parsing DFA for the following grammar. [5 points]

- 1) $S \rightarrow aSb$
- 2) $S \rightarrow c$

b) Write down the grammar and the ACTION and GOTO tables corresponding to the following LR(1) parsing DFA. [5 points]



$$S \rightarrow aA$$

$$A \rightarrow Bb$$

$$B \rightarrow C$$

BEST OF LUCK!