

2	Consider the language that the following grammar defines:									
	<S> = \$ <W> \$<S>									
	<W> = abb a <W>bb									
	Write all strings that are in this language and that contain seven or fewer characters.									
		simple <S>	variations of W	\$<S> combos						
		\$	abb	\$abb						
		\$\$	aabbbb	\$\$abb						
		\$\$\$		\$\$\$abb						
		\$\$\$\$		\$\$\$\$abb						
		\$\$\$\$\$		\$aabbbb						
		\$\$\$\$\$\$								
		\$\$\$\$\$\$\$								
3	Write a recursive grammar for the language of strings of one or more letters. The first letter of each string must be uppercase, and all other letters in the string must be lowercase.									
	<word> = <Upper><LowerCase>									
	<LowerCase> = <Lower> <Lower><LowerCase>									
	<Lower> = a b ... z									
	<Upper> = A B ... Z									
4	Consider a language of character strings that contain only dots and dashes. All strings in this language contain at least four characters and begin with either two dots or two dashes. If the first two characters are dots, the last one must be a dash; if the first two characters are dashes, the last one must be a dot. Write a recursive grammar for this language.									
	<word> = <dot><dot><x><dash>  <dash><dash><x><dot>									
	<x> = <dot> <dash>  <x><dot>   <x><dash>									
	<dot> = .									
	<dash> = -									
5 a	<word> = X<middle>   X<middle>Y									
	<middle> = <empty string>   X   Z   <middle>X   <middle>Z									
b	X									
	XZ									
	XY									
6	<word> = <dot>   <dash> <word>   <word><dot>									
a	<dot>                  <dash><dot>									

		<code>&lt;dot&gt;&lt;dot&gt;</code>	<code>&lt;dash&gt;&lt;dash&gt;&lt;dot&gt; &lt;dash&gt;&lt;dot&gt;&lt;dot&gt;</code>								
		<code>&lt;dot&gt;&lt;dot&gt;&lt;dot&gt;</code>									
b		Is the string <code>••• – –</code> in this language? Explain.									
		Per second rule " <code>&lt;dash&gt;&lt;word&gt;</code> " dashes are always left of the word. This is not possible									
c		Write a seven-character string that contains more dashes than dots and is in the language. Show how you know that your answer is correct.									
		1st word	<code>&lt;dot&gt;</code>								
		2nd word	<code>&lt;dot&gt;&lt;1st word&gt;</code>	<code>&lt;dot&gt;&lt;dot&gt;</code>							
		6th word	<code>&lt;dot&gt;&lt;5nd word&gt;</code>	<code>&lt;dot&gt;&lt;dot&gt;&lt;dot&gt;&lt;dot&gt;&lt;dot&gt;&lt;dot&gt;</code>							
		7ths word	<code>&lt;6th word&gt;&lt;dash&gt;</code>	<code>&lt;dot&gt;&lt;dot&gt;&lt;dot&gt;&lt;dot&gt;&lt;dot&gt;&lt;dot&gt;&lt;dash&gt;</code>							
		the iterations shows the final answer is correct									
9 a		<code>&lt; legal_word &gt; = empty string   A &lt; legal_word &gt; BB</code>									
10	Is <code>+* a – b / c ++ de – fg</code> a prefix expression? Explain in terms of the grammar for prefix expressions										
		the prefix has the format that has operator followed by 2 prefix and this format matches prefix. This string begins with operator so it is a prefix. The prefix is invalid									
			<code>&lt;prefix&gt;. = &lt;identifier&gt;   &lt;operator&gt; &lt;prefix&gt; &lt;prefix&gt;</code>								
		<code>+E1E2</code>	<code>E1=*E3E4</code>								
			<code>E3=a</code>								
			<code>E4=-E5E6</code>								
			<code>E5=b</code>								
			<code>E6=/E7E8</code>								
			<code>E7=c</code>								
			<code>E8=+E9E10</code>								
			<code>E9=+E11E12</code>								
			<code>E11=d</code>								
			<code>E12=e</code>								
			<code>E10=-E13E14</code>								
			<code>E13=f</code>								
			<code>E14=g</code>								
		E2 is missing and this expression is invalid									
11	Is <code>ab /c * efg * h /+d →</code> a postfix expression? Explain in terms of the grammar for postfix expressions.										
		<code>&lt;postfix&gt; = &lt;identifier&gt; &lt;postfix&gt;&lt;postfix&gt;&lt;operator&gt;</code>									

		this is a postfix expression because it follows the a b / -> <postfix><postfix><operator>. The expression is invalid							
		E1E2/							
		E1=a							
		E2=b							
		E3E4*							
		E3=E1E2/							
		E4=c							
		E5E6<no operator>							
		E5=E3E4*							
		E6=e							
		but operator is missing after E6 and hence it's an invalid expression							
12	Consider the language that the following grammar defines:								
	<S> = <L>   <D><S><S>								
	<L> = A B								
	<D> = 1  2								
	a. Write all three-character strings that are in this language.								
	first	second							
	A	1AA							
	B	2AA							
		1BB							
		2BB							
	b. Write one string in this language that contains more than three characters								
		third							
		11AA1AA							
		12AA2AA							
		11BB1BB							
		21BB1BB							
13	Consider a language of the following character strings: The letter A , the letter B , the letter C followed by a string that is in the language, and the letter D followed by a string in the language. For example, these strings are in this language: A, CA, CCA, DCA, B, CB, CCB, DB, and DCCB.								
	a. Write a grammar for this language.								
	<word> = A B C D   A<word>   B<word>   C<word>   D<word>								
	b. Is CAB in this language? Explain.								
	first	B							
	2nd	AB	A<firt>						

		third	CAB	C<2nd>						
		Yest, its possible								