

# Homework - Desmond

Wednesday, September 11, 2019 10:34 PM

HW #1: Show  $A^*$  is ably  $\omega$   
for  $A = \{a, b, c\}$

- \* Just like we did for  $A = \{a, b\}$ , we list out the strings in  $A^*$  in order of their size
- \* Given the strings in  $A^*$  of size  $k$ , the strings of size  $k+1$  are formed by concatenating each string in  $A$  to each string of size  $k$

size	:	<u>0</u>	<u>1</u>	<u>2</u>		<u>3</u>			
languages:	:	$\epsilon$	$a$	$aa$	$ba$	$ca$	$aaa$	$baa$	$caa$
	:		$b$	$ab$	$bb$	$cb$	$aab$	$bab$	$cab$
	:		$c$	$ac$	$bc$	$cc$	$aac$	$bac$	$cac$
	:						$aba$	$bba$	$cba$
	:						$\vdots$	$\vdots$	$\vdots$

- \* This ends up listing the strings first by length then by lexical order.

HW #2: What regular expressions generate  $\omega$  behavior

An regular expression with the symbol  $*$ .  
For example, the regular expression  $bvc^*$  will generate the regular language  $\{b\} \cup \{c\}^*$   
where  $\{c\}^* = \{\epsilon, c, c^2, c^3, \dots\} \Rightarrow$  infinite in size

HW #3: How many reg. lang are there? | Thought question

In forming regular languages, we can combine the elements in an alphabet  $A$  and the symbols  $\cup$  and  $*$  as in the rules 1-5.  
If there is no restriction on how much we can re-use these symbols & elements, then we have infinitely many ways to combine them, thus allowing for an infinite no. of regular languages

HW #4: Give an example of a non-regular expression on alphabet  $A$

The expression  $a^b$  is non-regular since it doesn't follow from any of the rules we listed