

# Re: pumping lemma for CFL

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*Source:* <http://sci.tech-archive.net/Archive/sci.math/2005-11/msg00369.html>

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- *From:* Brian <[wray0016@xxxxxxxxxxxxxxxxx](mailto:wray0016@xxxxxxxxxxxxxxxxx)>
  - *Date:* Wed, 02 Nov 2005 13:00:47 -0600
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The "basic" version of the pumping lemma goes more or less like this:

If some language  $L$  is regular, then there is some number  $p$  (pumping length), where you can take any string in  $L$  of at least length  $p$  and divide it into three strings:  $x$ ,  $y$ , and  $z$ , where  $y$  is not empty. Then, you can "repeat" or "pump"  $y$  up as many times as you want ( $\geq 0$ ) and the resulting string is in  $L$ .

For example, given some string in a language  $L$  divided into three parts  $x$ ,  $y$ , and  $z$ :

We have " $xyz$ " being in  $L$ . Now, we pump up the string  $y$   $n$  times, with  $n \geq 0$ .

$n=0$  gives us " $xz$ "  
 $n=1$  gives us " $xyz$ "  
 $n=2$  gives us " $xyyz$ "  
 $n=3$  gives us " $xyyyz$ "

etc.

If  $L$  is regular, then all these strings have to be in  $L$  given that  $xyz$  is in  $L$ . If any of these "pumped" strings are NOT in  $L$ , then the language is not regular.

Hope this helps.

On Wed, 02 Nov 2005 16:15:01 +0000, robm wrote:

- > sorry for amateur question but...
- > can someone give links to info that helps one capture/grasp the pumping lemma for CFL ? i am missing something, some basic **\*\*important\*\*** aspect
- > that preventing me from going from following an example to applying it to solutions
- >
- > I've looked at three books, one practical approach tries to describe plus define but the explanation seems to make big leaps in my amateur misunderstanding mind, and then two very formal math oriented with very
- > succinct definitions and compact proofs and examples
- >

Re: pumping lemma for CFL

- > I've looked at these web sites and others which give similar definition and
- > description but no example that helps my mind capture the essence of the
- > pumping Lemma
- >
- > en.wikipedia.org/wiki/Pumping\_lemma
- > www.cs.brandeis.edu/~mairson/poems/node1.html
- > www.cs.may.ie/~jpower/Courses/parsing/node41.html
- > www.cs.wpi.edu/~alvarez/CS3133/pumping.html
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- > TIA for any helpful info
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• *Follow-Ups:*

- ◆ *Re: pumping lemma for CFL*  
◇ *From:* Robert Low
- ◆ *Re: pumping lemma for CFL*  
◇ *From:* robm
- ◆ *Re: pumping lemma for CFL*  
◇ *From:* Rick Decker

• *References:*

- ◆ *pumping lemma for CFL*  
◇ *From:* robm

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