Computer Science 456/656: the Pumping Lemmas

Pumping Lemma for Regular Languages. For any regular language L
There exists a number p (called the *pumping length* of L such that
For any string $w \in L$ of length at least p
There exist strings x, y, and z such that

1. $xyz = w$
2. $|xy| \leq p$
3. y is not the empty string
4. For any integer $i \geq 0$ $xy^iz \in L$

Pumping Lemma for Context-Free Languages. For any context-free language L
There exists a number p (called the *pumping length* of L such that
For any string $w \in L$ of length at least p
There exist strings u, v, x, y, and z such that

1. $uvxyz = w$
2. $|vxy| \leq p$
3. v and y are not both the empty string
4. For any integer $i \geq 0$ $uv^ixy^iz \in L$