CS 302 **20 October, 2016**

QUIZ 3

ANSWER

Suppose that L is *regular*. Let $n > 0$ be the integer given by the *pumping lemma*.

Choose $w = 0^{n+1}.1.0^{n+1}$; then $|w| \geq n$ and $w \in L$ with $k=n+1$ and $m = 1 < n+1$.

Then by pumping lemma $w = x.y.z$ and $|x.y| \leq n$ and $|y| > 0$ and thus $x.y = 0^p$ and

for $y = 0^q$ with $q > 0$ *we have* $x = 0^{p-q}$; $z = 0^{n+1-p}.1.0^{n+1}$. Hence $x.y^i.z = x.z$ for $i = 0$ and

$x.z = 0^{p-q}.0^{n+1-p}.1.0^{n+1} = 0^{n+1-q}.1.0^{n+1} \notin L$ *since* $q > 0$. This *contradicts* the conclusion of

the pumping lemma which states that $x.y^i.z \in L$ for all i , in particular for $i=0$.