KAIST School of Computing 291 Daehak-ro, Yuseong-gu, Daejeon 305-701, Republic of Korea
Tel. +82-42-350-3502~3507 Fax. +82-42-350-3510

Prof. Dr. Martin Ziegler
+82-42-350-3568
ziegler@kaist.ac.kr
http://m.zie.de

# CS422 Fall 2015 <u>Quiz</u>

In which of the following cases is the set $L \subseteq \{0,1\}^*$ *semi-decidable*?

Please mark the correct box(es):

☐ If, for every $\underline{x} \in \{0,1\}^*$, there exists an algorithm $\mathcal{A}$ that, on input of $x$, answers within a finite number of steps whether $\underline{x} \in L$ or not.

▣ If there exists an algorithm $\mathcal{A}$ that, for every $\underline{x} \in \{0,1\}^*$, on input of $\underline{x}$ answers within a finite number of steps whether $\underline{x} \in L$ or not.

☐ If there exists an algorithm $\mathcal{A}$ that, for some $\underline{x} \in \{0,1\}^*$, on input of $\underline{x}$ answers within a finite number of steps whether $\underline{x} \in L$ or not.

☐ If there exists an algorithm $\mathcal{A}$ that, for every $\underline{x} \in \{0,1\}^*$, on input of $\underline{x}$ answers within a finite number of steps in case $\underline{x} \in L$ and behaves arbitrarily otherwise.

▣ If there exists an algorithm $\mathcal{A}$ that, for every $\underline{x} \in \{0,1\}^*$, on input of $\underline{x}$ answers arbitrarily in case $\underline{x} \in L$ and gives no answer otherwise.

☐ If there exists an algorithm $\mathcal{B}$ that, for every $\underline{x} \in \{0,1\}^*$, on input of $\underline{x}$ answers arbitrarily in case $\underline{x} \notin L$ and gives no answer otherwise.

▣ If there exist two algorithms $\mathcal{A}$ and $\mathcal{B}$ where, for every $\underline{x} \in \{0,1\}^*$, $\mathcal{A}$ on input of $\underline{x}$ answers iff $\underline{x} \in L$, and $\mathcal{B}$ on input of $\underline{x}$ answers iff $\underline{x} \notin L$.

▣ If there exists an algorithm $\mathcal{A}$ that ignores its input and prints all $\underline{x} \in L$ in arbitrary order, possibly with repetition.

▣ If there exists an algorithm $\mathcal{A}$ that ignores its input and prints all $\underline{x} \in L$ in lexicographical order without repetition.

☐ If there exists an algorithm $\mathcal{A}$ that ignores its input and prints infinitely many $\underline{x} \in L$ without repetition.

▣ If the set $L$ is finite.

▣ If the set $L$ has finite complement $L^C = \{0,1\}^* \setminus L$.