Assignment 8

Due on 2017-09-25, 23:59 IST.

Submitted assignment

This assignment is regarding syntax based testing, regular expressions, context-free grammars and mutation testing of source code at unit level. Each question carries 1 mark.

1) Which of the following describes the language accepted by the regular expression $a \cdot (a + b)^* \cdot a$ over the alphabet $\{a, b\}$?

- $L = \{w \mid w$ ends with an $a\}$.  
- $L = \{w \mid w$ begins and ends with an $a\}$.  
- $L = \{w \mid w$ begins with an $a\}$.  
- $L = \Sigma^*$.  

No, the answer is incorrect.
Score: 0

Accepted Answers:

- $L = \{w \mid w$ begins and ends with an $a\}$.  

2) Which of the following is a list containing strings generated by the CFC $G = (N, T, P, S)$ where $N = \{S\}$, $T = \{a, b\}$ and $P = \{S \rightarrow aSb, S \rightarrow ab\}$?

- $ab, aabb, abb$.  
- $ab$.  
- $ab, aabb, aaaaabbb$.  
- $aabb, abb$.  

No, the answer is incorrect.
Score: 0

Accepted Answers:

- $ab, aabb, aaaaabbb$.  

Score: 0
3) If a test case satisfies just the conditions of reachability and infection, then it is said to \ldots \ldots . kill a mutant.

No, the answer is incorrect.
Score: 0
Accepted Answers:
* (Type: String) weakly

4) State true or false: Higher mutation score indicates effective testing.

\[ \begin{array}{ll}
\text{True} & \\
\text{False} & \\
\end{array} \]

No, the answer is incorrect.
Score: 0
Accepted Answers:
* (Type: String) False

5) The mutation operator \texttt{failOnZero()} causes the argument to become \ldots \ldots .

No, the answer is incorrect.
Score: 0
Accepted Answers:
* (Type: String) Zero

PLEASE REFER THE DATA MENTIONED BELOW FOR THE QUESTIONS 6 TO 10

For the questions below, consider the following method \texttt{findVal}. The method throws \texttt{NullPointerException} if the array \texttt{numbers} is \texttt{null}. Otherwise, it regurgits the last occurrence of \texttt{val} in \texttt{numbers[]} if \texttt{val} is not found in \texttt{numbers[]}, it returns -1. The method also contains an initial mutation, of line 4, depicted as \( \Delta 4 \).

\begin{verbatim}
public static int findVal(int numbers[], int val) {
    int findVal = -1;
    for (int i=0; i<numbers.length; i++)
        for (int i=1; i<numbers.length; i++)
            if (numbers[i] == val)
                findVal = i;
    return(findVal);
}
\end{verbatim}

Answer the following five questions for the above method with its mutant.

6) State true or false: It is always possible to reach the mutant in line 4.

\[ \begin{array}{ll}
\text{True} & \\
\end{array} \]
7) State true or false: It is possible to find a test input that satisfies reachability but not infection for the mutant. 

- False
- True

No, the answer is incorrect.
Score: 0
Accepted Answers: 
True

8) State yes or no: Can reachability and infection occur even if the input is null? 

- Yes
- No

No, the answer is incorrect.
Score: 0
Accepted Answers: 
Yes

9) Which of the following is true about the test input numbers = [1,1] and val = 1? 

- The given test input satisfies infection and propagation.
- The given test input satisfies infection but not propagation.

No, the answer is incorrect.
Score: 0
Accepted Answers: 
The given test input satisfies infection but not propagation.

10) Which of the following describes a generic property about a test input that strongly kills the given mutant? 

- Any input with val only in numbers[0] will strongly kill the mutant.
- No input can strongly kill the mutant.

No, the answer is incorrect.
Score: 0
Accepted Answers: 
Any input with val only in numbers[0] will strongly kill the mutant.