

ECE 322
SOFTWARE TESTING AND MAINTENANCE
Fall 2019

Assignment #2

Due date: Monday, October 7, 2019 by 3:00 PM
(return to the appropriate box- 2nd floor of DICE building)

Total: 40 points

Value 10 points

1. Develop software specifications for a simple e-shopping system using the formalism of finite state machines. Consider some selected functionality. Make appropriate assumptions.

Note: there could be a variety of possible solutions; there is nothing wrong about that. Your answer will be evaluated on a basis of its completeness and correctness (taking into consideration the assumptions you have made).

Value 10 points

2. Suggest a collection of test cases to test a procedure finding a maximum of three integer numbers

`maxofThreeNumbers(int n1, int n2, int n3)`

Consider (i) exhaustive testing and (ii) error guessing.

3.(i) Suppose that an application has n inputs (variables) and each variable partitions its input space in m equivalence classes. Determine the number of equivalence classes. How many tests do you require. Could be the number of tests made lower? Do detailed calculations for $n=10$ and $m=10$.

(ii) a system invokes function S if the reading of a given sensor is within the $[a, b]$ or $[c, d]$, $b < c$. The entire range of possible values is $[-50, 50]$. Identify equivalence classes. List a collection of tests.

(iii) generalize the problem in (ii) by considering that there are two sensors where the function is invoked for the sensors' readings are in $[a_i, b_i]$ or $[c_i, d_i]$, $b_i < c_i$, $i=1, 2$. How many test cases do you require here.

Value 10 points

4. Consider a 3-dimensional input domain described as

$$W = [0, 10] \times [-5, 20] \times [0, 7]$$

(viz. there are 3 input variables assuming values in the corresponding intervals). In this domain there are three equivalence classes

$$W_1 = \{(x, y, z) \mid \max(|x-1|, |y-1|, |z-1|) \leq e\}$$

$$W_2 = \{(x, y, z) \mid \max(|x-5|, |y-10|, |z-4|) \leq e\}$$

$$W_3 = W - W_1 - W_2$$

where e is a certain positive number. What should be possible values of e so that these equivalence classes form a partition?