

Practice Questions for Feb 14, 2019

1. Consider the code below. As usual, H and W are two subsets (represented as 0/1-arrays) of a universe of discourse Ω .

```
for (int i=0; i<H.length; i++)
    if (H[i] > W[i]) return(false);
return(true);
```

Fill the following table to analyze the performance of the above code for the fixed $H = [1, 0, 0, 1, 1, 1]$ and an arbitrary 0/1-array W of length 6. (Remember to use '?' to indicate don't care situation in describing the form of W .)
Note that there may not be a W for every value (1 to 6) of #(iterations).

#(iterations)	Return value	Form of W	#(such W 's)
1	false

Now, based on the table, compute the average #(iterations).

2. What do you think the above code is testing, i.e., when will it return true (express your answer both in English and in set notation)?
3. Repeat Problems 1 and 2 with " $H[i] > W[i]$ " replaced by " $H[i] \geq W[i]$ " in the code above.
4. If $A \Delta B = \emptyset$ what does that say about A and B ? (Show the possible Venn-diagrams with $A \Delta B = \emptyset$.)

What can you say for the case $A \Delta B \Delta C = \emptyset$? (Show the possible Venn-diagrams with $A \Delta B \Delta C = \emptyset$. Also, give example A, B, C with $A \Delta B \Delta C = \emptyset$; keep them fairly general, i.e., unlike $A = B = C = \emptyset$.)

What is the relationship between $|A \Delta B|$ and $|A \cup B|$? What is the relationship between $|A \Delta B \Delta C|$ and $|A \cup B \cup C|$?

5. What do we mean by "The symmetric difference operation Δ on sets is an associative operation"? Which of the operations " \cup " and " \cap " are associative?