Question 1: **[5+5] Marks**

i. Determine whether these system specifications are consistent:
   a. "The diagnostic message is stored in the buffer or it is retransmitted."
   b. "The diagnostic message is not stored in the buffer."
   c. "If the diagnostic message is stored in the buffer, then it is retransmitted."

ii. Determine whether these system specifications are consistent:
   a. "The diagnostic message is stored in the buffer or it is retransmitted."
   b. "The diagnostic message is not stored in the buffer."
   c. "If the diagnostic message is stored in the buffer, then it is retransmitted."
   d. "The diagnostic message is not retransmitted"

Question 2: **10 Marks**

You are given as input a function "`int F(int x)`" and two arrays, `int D[n]` containing elements of the domain of the function and `int C[m]` containing elements of the codomain of the function (Note: `n` and `m` could be the same number). Write a code fragment to determine whether or not the function is:

i. One-to-One
ii. Onto
iii. One-to-One and Onto (One-to-One Correspondence)

Question 3: **5 Marks**

Show that the |(0, 1)| = |(0, 1]|.

Hint: See the SCHRÖDER-BERNSTEIN THEOREM

Question 4: **10 Marks**

While studying the countable sets; we saw the use of dovetailing technique to show that the set of positive rational numbers is countable. Write a computer program

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You may work in groups of 2-3 students; One submission is sufficient for the whole group
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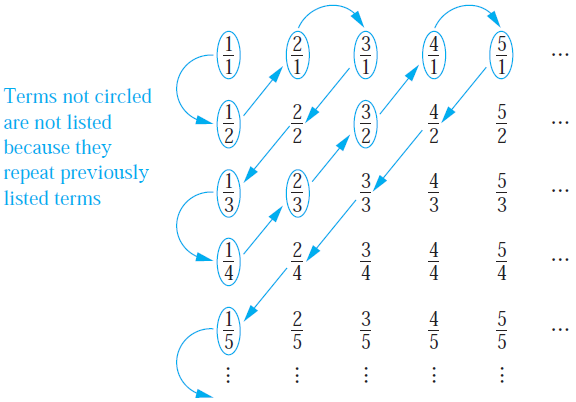
that prints first **1000** positive rational numbers using the method described in the Book.



Note: Your program should not print a number more than one time; e.g. in the figure above, the numbers that are not circles should not be printed by your program.

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