Imagine this scenario: I/O completion ports are communications ports which take handles to files, sockets, or any other I/O. When a Read or Write is submitted to them, they cache the data (if necessary), and attempt to take the request to completion. Upon error or completion, they call a user-supplied function to let the users application know that that particular request has completed. They work asynchronously, and can process an unlimited number of simultaneous requests. Design the implementation and thread models for I/O completion ports. Remember to take into account multi-processor machines.

Suppose you have an array of 1001 integers. The integers are in random order, but you know each of the integers is between 1 and 1000 (inclusive). In addition, each number appears only once in the array, except for one number, which occurs twice. Assume that you can access each element of the array only once. Describe an algorithm to find the repeated number. If you used auxiliary storage in your algorithm, can you find an algorithm that does not require it

Beautiful You Pvt. Ltd. owns several parlors. Research has shown that if a customer arrives and there is no staff available to service them, the customer will turn around and leave, thus costing the company a sale. Your task is to write a program that tells the company how many customers left without getting any service.

Write a Java program to check whether the message sent has any error using the error detection method Cyclic Redundancy Code ( CRC ).

In this problem, each letter of the alphabet corresponds to a number using the scheme: a=1, b=2, c=3, ... y=25, z=26. To encode a message, an encryption key word is added to the message. The key word is the first word in the message that is five or more characters long. For example, if the message were:

"give me liberty or give me death," the key word would be "liberty."

The encrypted message would be: s r x j e y k u k g w l s n d p k a w g d p n c y z

give me liberty or give me death  
libe rt ylibert yl iber ty liber  
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srxj ey kukgwls nd pkaw gd pncyz