National Institute of Technology, Calicut

**Department of Computer Science and Engineering**

CS2094 - Data Structures Lab

**Assignment #3\_Advanced**

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Q1. Merging Circular Linked Lists

1. Design and implement a function which takes a string as input and returns a pointer as output. The input string is the name of a file present in the same directory as your program, a binary file containing integers. Please note that the file is NOTan ascii text file containing the decimal notations of integers. The number of integers contained in the file is not stated (of, course there are easy ways of finding it!). Your function has to open the file, read the integers one by one and place them in the same order into singly linked list of integers. At the end of the file, the linked list has to be made circular and the function has to return a pointer to the first integer. If the file is empty, null pointer has to be returned, and naturally, if there is only one integer, the pointer to that node has to be returned.
2. Design and implement a function that takes as its input two pointers, each of which is a pointer to a node in a (different) circular singly linked list of integers. The function returns a pointer to a (first) node in the singly linked list obtained by merging the nodes in each of the lists in an alternate manner. Eg if a b c is the first list and d e f is the second, the merged list is a d b e c f. If a b c is the first list and d is the second, the merged list is a d b c. The nodes have to be linked by redirecting the pointers, copying of data is not permitted.
3. Design and implement a function which takes as its input a string and a pointer to a node in a circular linked list of integers. The function creates a binary file of the name same as the input string and writes into it all the integers in the linked list, starting from the given node, and ending at its previous node. The integers are written in their binary format.
4. Design and implement a function that takes two strings as input, the first is a binary file of integers. The function creates a file with the name given by the second string, and writes all the integers present in the first file into the second, in the ascii decimal format, one at a time.
5. Design and implement a function using the above functions, taking as its input three strings, the first two of which are names of files in the same directory containing integers in the binary format. The function creates a file with the name given by the third string, containing the integers in the first two merged in an alternatingmanner, the data in the file being in the ascii decimal format. The function should work by creating circular singly linked lists, merging them, creating an intermediate file with the name thirdstring.temp and then produce the required file.

Q2. Design and implement the solution to the priority queue problem, given in the Assignment #3 – Common, using doubly linked lists.