**Problem 1:** Write a program (P1.C or P1.CPP or etc) that converts a NFA to DFA. Program should read data from a file named P1.in and write converted finite automata to a file named P1.out with the format discussed below.

**Input File Format (P1.in):**

|  |  |
| --- | --- |
| a,b¶ | List of input alphabet |
| q0,q1,q2¶ | List of states, must in order start with q symbol |
| q0¶ | Initial state |
| q1,q2¶ | Final states |
| d(q0,a)={q1,q2,q3}¶ | Some rules end with an empty line |
| d(q1,L)={q2,q3}¶ | use 'L' capital as λ in these rules. |
| …¶ |  |
|  |  |

**Output File Format(P1.out):**

|  |  |
| --- | --- |
| a,b¶ | List of input alphabet |
| q0,q1,q2¶ | List of states, must in order start with q symbol |
| q0¶ | Initial state |
| q1,q2¶ | Final states |
| d(q0,a)={q1}¶ | Some rules end with an empty line |
| …¶ |  |

**Problem Deadline:**  11 May, 2005 12:00 AM ( 21 Ordibehesh 1384 )

**Problem 2:**Write a program (P2.C or P2.CPP or P2.PAS) that converts a Regular Expression to NFA. Program should read data from a file named P2.in and write converted finite automata to a file named P2.out with the format discussed below.

**Input File Format (P2.in):**

|  |  |
| --- | --- |
| Regular Expression ¶ | there are 3 operator ( ., +, and \*. \* is unary). There is no space in regular expression and regular expression may have parantheses.  star-closure precedes concatenation and concatenation preceedes union. symbol for concatnation will NOT omitted. |

**Output File Format(P2.out):**

|  |  |
| --- | --- |
| a,b¶ | List of input alphabet |
| q0,q1,q2¶ | List of states, must in order start with q symbol |
| q0¶ | Initial state |
| q1,q2¶ | Final states |
| d(q0,a)={q1,q2,q3}¶ | Some rules end with an empty line |
| d(q1,L)={q2,q3}¶ | use 'L' capital as in these rules. |
| …¶ |  |

**Problem 4:**According to Universal turing machine definition in p266 of your textbook, Write a program to convert a number to a turing machine. This number is in hex format in input file. the number should convert to binary and then convert to rules of turing machine. states and alphabets that used in rules should write as states and alphabet of turing machine in output file.

**Input File:**80EE12CC...¶                            : A hex number ended with an enter character.  
¶

**Output File:**q0,q2,q8¶                                    : Set of internal states  
a0,a2,a3¶                                     : Tape alphabets  
d(q0,a0)=(q1,a3,L)¶                   : Set of rules  
...

**Note1:**Use 1 for L command and 11 for R command.  
**Note2:**Input number **may not** represent a turing machine. for that number just write **"No Turing Machine"** in output file.  
**Note3:**Ignore all zeros at the left side of number (Zeros in binary format).

[Sample Input](http://www.bohlool.com/automata/p4.in)

[Sample Output](http://www.bohlool.com/automata/p4.out)

Deadline: 29 June 2005 ( 8 Tir 1384 ), After this date the scores will sent to the department.