Compiler Midterm of 2009

1. Regular Languages（CH4 – Slides page）
   1. Yes. By the definition, it’s called a regular language if the sentences in a language can be produced by regular expression. And I can produce a regular expression (ab)\*.
   2. No. Although I can produce a regular expression a\*b\*, but it won’t guarantee that the number of a’s and the number b’s will be the same, it will only guarantee that the a’s are on the left hand side and the b’s are on the right hand side.
   3. No. There is no any information about the number of a’s and b’s in a regular expression, so I can’t find a regular expression that can guarantee the number of a’s and b’s are the same.

ϵ

ϵ

ϵ

letter

letter

digit

ϵ

ϵ

8

ϵ

ϵ

ϵ

* 1. Initial: ϵ-closure(0) = {0}≡A  
     moveto(A, letter) = ϵ-closure({1}) = {1, 2, 3, 5, 8}≡B  
     moveto(A, digit) = ϵ-closure({}) = {}  
     moveto(B, letter) = ϵ-closure({4}) = {2, 3, 4, 5, 7, 8}≡C  
     moveto(B, digit) = ϵ-closure({6}) = {2, 3, 5, 6, 7, 8}≡D  
     moveto(C, letter) = ϵ-closure({4}) = C  
     moveto(C, digit) = ϵ-closure({6}) = D  
     moveto(D, letter) = ϵ-closure({4}) = C  
     moveto(D, digit) = ϵ-closure({6}) D

B

letter

letter

C

D

digit

digit

letter

letter

digit

|  |  |  |
| --- | --- | --- |
| State | letter | Digit |
| A | B | -- |
| B | C | D |
| C | C | D |
| D | C | D |

* 1. Split into two groups: {A}≡0 {B, C, D}≡1  
     Test:  
     (B, letter) 🡪 C   
     (B, digit) 🡪 D   
     (C, letter) 🡪 C   
     (C, digit) 🡪 D   
     (D, letter) 🡪 C   
     (D, digit) 🡪 D   
     ∴ {B, C, D} are undistinguishable 🡺 Equivalent.

1

letter

digit

letter

1. Out of range.
2. Out of range.
3. Out of range

The other two files are the final exam.