# Chapter 4

* b\* **+** ab\* = (A + a)b\*
* (a\*b\*)\* **=** (a + b)\*
* (a + c)b\* = ab\* **+** cb\* => Distributive law
* (a **+** b)\*(aa **+** bb)(a **+** b)\* => All words that contain a double letter
* (A + b) (ab)\* (A **+** a) => All words that don’t contain a double letter
* (a **+** b)\*a(a **+** b)\*a(a **+** b)**\* =>** All words that contain at least two a’s
* [aa + bb **+** (ab+ba)(aa+bb)\*(ab+ba)]\* => Even-Even (even number of a’s and even number of b’s)
* b\*(abb\*)\*(A **+** a) or (b + ab)\*(a + A) => All words without a double a
* (b + aaa)\* => All words in which a appears tripled
* (a + b)\*(s1 + s2 + s3 + s4)+(a + b)\* => All words having at least one of strings s1, s2, s3, s4
* (a + b)\*b(a + b)\*b(a + b)\*b(a + b)\* => All words having exactly three b’s
* (a + b)\*b(a + b)\*b(a + b)\* + (a + b)\*b(a + b)\*b(a + b)\*b(a + b)\* => All words having exactly two b’s or exactly three b’s, no more or less
* (a **+** b)\*(aa **+** bb) => All words that end in double letter
* (a **+** b)\*(ab + ba) + a + b + A => All words that don’t end in double letter
* (A + b)(ab)\*aa(ba)\*(A **+** b) + (A + a)(ba)\*bb(ab)\*(A **+** a) => All words having exactly one double letter in them
* (a + ba + baa)\*( A + b + bb) => All words in which b is never tripled
* (A + b + bb)(a + ab + abb)\*aaa(A + b + bb)(a + ab + abb)\*  
  +  
  (A + a + aa)(b + ba + baa)\*bbb(A + a + aa) (b + ba + baa)\* => All words in which a is tripled or b is tripled but not both
* b\*a\* => All words that don’t contain the substring ‘ab’
* a\*(baa\*)\*b\* + b\*(a\*ab)\*a\* => All words that don’t contain both ‘bba’ and ‘aab’
* (b\*ab\*ab\*ab\*)b\* => All words in which the total number of a’s is divisible by three
* a\*(b(bb)\*aa\*)\*(A+b(bb)\*) =>All words having clumps of odd number of b’s



* (aa + bb + ab + ba)\* => Even number of total letters
* (a + ba\* ba\* b)+ => Total number of b’s divisible by 3
* b\*a(b\*ab\*ab\*)\* => Odd number of a’s