**CS 332 M01 HW 1**

Let ∑ = { a, b } for all problems.

1. (5 pts) Let language L1 be the language where all a's appear in sequences of three (aaa, they must be adjacent). String may have no a's, and the empty string is in L1. Create a BNF grammar for L1.
2. S 🡪 A | λ
3. A🡪 aaaA
4. A 🡪 aaa
5. A🡪 bA
6. A🡪 b
7. (5 pts) Provide a derivation for the string u = aaabbaaa.
   1. u = aaabbaaa

|  |  |
| --- | --- |
| S |  |
| A | 1 |
| aaaA | 2 |
| aaabA | 4 |
| aaabbA | 5 |
| aaabbaaa | 3 |

1. (5 pts) provide the regular expression for L1.
   1. ( (aaa)\* + b\*)\*
2. (5 pts) Let language L2=(a+b)\*(aa)\*bb. Provide a BNF grammar for L2.
3. S 🡪 A
4. A 🡪 B
5. A 🡪 aA
6. A 🡪 bA
7. B 🡪 aaB
8. B🡪 bb
9. (5 pts) Use your grammar for L2 to provide a derivation for the string u = aaabb.
   1. u = aaabb

|  |  |
| --- | --- |
| S |  |
| A | 1 |
| aA | 3 |
| aB | 2 |
| aaaB | 5 |
| aaabb | 6 |