Problem 1

See permutations.cpp

Problem 2

a.) for n = 2
12 21
for n = 3
123 213 312 132 231 321
for n = 4
1234 2134 3124 1324 2314 3214 4231 2431 3421 4321 2341 3241 4132 1432 3412 4312 1342 3142 4123 1423 2413 4213 1243 2143

b.) for n = 2
12 21
for n = 3
123 132 312 321 231 213
for n = 4
1234 1243 1423 4123 4132 1432 1342 1324 3124 3142 3412 4312 4321 3421 3241 3214 2314 2341 2431 4231 4213 2413 2143 2134

Problem 3

Algorithm 1: Binary Strings Pseudocode

```
String genStrings(int n, int[] arr, int i){
   if( i == n )
           print arr

   arr[i] = 0
   genStrings(n, arr, i + 1)
   arr[i] = 1
   genStrings(n, arr, i + 1)
}
```

Problem 4

$T(n) = 4T\frac{n}{2} + n, T(1) = 1$
$a = 4, b = 2, d = 0, f(n) = n \therefore n^{log_b^d} = n^{log_2^4}$
$= n^{2log_2^2} = n^{2*1}$
$=n^2$
$\therefore T(n) = \theta(n^2)$

$T(n) = 4T\frac{n}{2} + n^2, T(1) = 1$
$a = 4, b = 2, d = 2, f(n) = n^2$
$n^d log(n) = n^2 log(n)$
$\therefore T(n) = \theta(n^2 log(n))$

$T(n) = 4T\frac{n}{2} + n^3, T(1) = 1$
$a = 4, b = 2, d = 3, f(n) = n^3$
$n^d = n^3$
$\therefore T(n) = \theta(n^3)$