Hw 4.

5.1.7 The efficiency classes will be the same for both algorithms but innermost loops differ in swap operation. Writing out swap operation into 3 equivalent assignments will make a difference in algorithm execution time. Thus difference will be $\Theta(n^2)$ instead of $\Theta(n)$.

5.2.8a.

Let $F$ be a DFS forest for $G$. Each of 2 classes of tree is no such edge connecting two vertices both on odd layer or both on even layers of the forest. A simple DFS traversal has to fail if this property is failed.

5.4.7

$\forall n \in \mathbb{N}$ 

if $n = 0$

write $\mathbf{B}$

else

$B[\text{len}-1] = 0$; BitStrRec($n-1$)

$B[\text{len}-1] = 1$; BitStrRec($n-1$)
5.5.1

\[ A(x) = \log FL (x) \]
\[ \text{if } n = 1 \text{ return } 0 \]
\[ \text{else return } \log FL \left( \frac{n}{2} \right) + 1 \]

\[
\text{Line: } 
\begin{align*}
A(n) &= A\left( \frac{n}{2} \right) + 1 \quad &\text{for } n > 1 \quad A(1) = 0 \\
A(n) &= \lfloor \log_2 n \rfloor \in \Theta \left( \log(n) \right)
\end{align*}
\]

5.6.11

\[ \text{Alg. Pancake } (S, n) \]
\[ \text{if } (n = 1) \text{ return } S \quad \text{// stack of pancakes } S, \text{ size } n \]
\[ i = \text{Get Index Of Largest Pancake } (S, n) \]
\[ \text{Invert Flippers under Indexes } (S, i) \]
\[ \text{Flip Stack } (S, 0 - i) \]
\[ \text{Flip Stack } (S, 0 - n) \]
\[ \text{Pancake } (S, n-1) \]