CSCE 586 - Design and Analysis of Algorithms
Date: Thursday 6th December, 2018
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Assignment: Final Exam - Take Home Portion, Version A
Documentation:

Problem 1 - Handout

Problem Statement:

Description of Algorithm:

Algorithm 1 Delete-Cycles(S, u)

Push u into S
$V \leftarrow V \cup u$
for Vertices v_i incident to u **do**
  if $v \notin V$ **then**
    $Delete - Cycles(S, v)$
  else if $v \in V \text{and } v \in S$
    Delete edge $u \rightarrow v$
  end if
end for
Pop u from S
return

Asymptotic Analysis:

Worst Case:
Best Case:
Average Case:

Proof:

Chapter 5, Problem #4

Problem Statement:

Description of Algorithm:

Asymptotic Analysis:

Worst Case:

Best Case:

Average Case:

Proof:

Chapter 6, Problem #9

Problem Statement:

Description of Algorithm:

Algorithm 2 Pseudocode of Algorithm:

for $j = 1 \rightarrow n$ **do**
  $OPT(n, j) \leftarrow min(x_n, s_j)$
end for
for $i = n - 1 \rightarrow 1$ **do**
  for $j = 1 \rightarrow i$ **do**
    $OPT(i, j) = max[OPT(i + 1, 1), min(x_i, s_j) + OPT(i + 1, j + 1)]$
  end for
end for
return $OPT(1, 1)$

Asymptotic Analysis:

Worst Case:
Best Case:
Average Case:

Proof:

Chapter 6, Problem #12

Problem Statement:

Description of Algorithm:

Algorithm 3 Dynamic Programming for Minimum Server Cost

Let $OPT(0) = 0$ and $\binom{1}{2} = 0$
for $1 \leq j \leq (n-1)$ **do**
    $OPT(j) \leftarrow c_j + min_{0 \leq i < j}(OPT(i) + \binom{j-i}{2})$
end for
$OPT(n) = OPT(n-1) + c_n$.
return $OPT(n)$

Asymptotic Analysis:

Worst Case:
Best Case:
Average Case:

Proof: