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**DSA4413 – Fall 2019**

**Homework #3**

**1a)**

For selection, each iteration we have (n-1) comparison,

T(n) = (n-1) + (n-2) + (n-3) + …. + 3 + 2 + 1

T(n) = sum(i, for i=1 to (n-1) )

For HW2:

**sum(i, for i=1 to n) =** **n(n+1) /2**

sum(i, for i=1 to (n-1) ) = **n(n+1) /2 – n = ½( n^2 +n – 2n) =** **1/2 (n^2 – n)**

lim (**1/2 (n^2 – n)/n^2**) n -> inf

= ½(inf^2 – inf) /inf^2 = ½

A screenshot of a cell phone

Description automatically generated

Plot T(n) = **1/2 (n^2 – n)**

**1b)**

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F2(n) < T(n) < f1(n) for all n>=2

2)

3)

4)

T(2^k -1) = T([(2^k-1)/2]) + 1

= T([(2^k-1)/4]) + 1 + 1

= T([(2^k-1)/8]) + 1 + 1 + 1

For k >= 1