# Algorithms (COT 6405): Assignment 7

**Due date: October 9 (Thursday)**

**Problem 1** (5 points)
Let $A[1..n]$ be a *sorted* array of $n$ distinct integer numbers. Write an efficient algorithm INDEX-SEARCH$(A, n)$ that finds an index $i$ such that $A[i] = i$. If the array does not have such an element, the algorithm should return 0.

**Problem 2** (5 points)
We consider an array $A[1..n]$ and define a segment sum from $p$ to $r$, where $1 \leq p \leq r \leq n$:

$$sum(p, r) = \sum_{p \leq i \leq r} A[i].$$

In other words, $sum(p, r)$ is the sum of all array elements in the segment $A[p..r]$. Note that the total number of distinct segments is $\frac{n(n+1)}{2}$. Write an efficient algorithm that determines the maximum over all segments sums; for the full credit, its running time should be $\Theta(n)$.