

1. Recurrence:
  - a. Where  $s$  is the upper limit for  $i$  and unknown in this circumstance, and  $a$  is a constant:
    - i.  $T(s) = a$
  - b. Where  $i$  is a value that changes with every recursive call, and  $b$  is a constant:
    - i.  $T(i) = b + T(i + 1)$
  - c. Thus, the recurrence is:
    - i.  $T(s) = a$
    - ii.  $T(i) = b + T(i + 1)$
2. Closed form:
  - a. Using the same variables as part 1:
    - i.  $T(i) = b + T(i + 1)$
  - b. Then, with substitution:
    - i.  $T(i) = jb + T(i + j)$  for some  $j$ , where all  $j \leq s - i$
  - c. Let  $j = s - i$ 
    - i.  $jb + T(s)$
    - ii.  $jb + a$
  - d. Asymptotic Notation:
    - i.  $T(i)$  is  $\theta(i)$