Name: _____

1. (10 points) The algorithm P-SUM computes the sum of the elements of an array L of length n. Draw the DAG for P-SUM when L is an array of length 8. Determine the work, span, and parallelism from the DAG. Show all work.

```
P-SUM(L)
1  n = L.length
2  if n == 1
3        return L[1]
4  c = ⌊n/2⌋
5  x = spawn P-SUM(L[1 .. c])
6  y = P-SUM(L[c + 1 .. n])
7  sync
8  return x + y
```

(continued on other side)

2. (10 points) The algorithm MAT-VEC computes the product of an n-by-n matrix A and an n-long vector x:

```
MAT-VEC(A)
1  n = A.rows
2  let y be a new vector of length n
3  parallel for i = 1 to n
4        y_i = 0
5  parallel for i = 1 to n
6        for new j = 1 to n
7              y_i = y_i + a_ij · x_j
8  return y
```

Determine the work, span, and parallelism of MAT-VEC. What is the *parallel slackness* when $n = 256$ and $P = 16$? Show all work and any formulas used.