

## CSCE 330 Fall 2022

### QUIZ 4

Assigned Wednesday, 22-10-06

Consider the following recursive program to compute powers of 2.

```
% pow(N,P) holds when  $P=2^N$ .  
pow(0,1).  
pow(N,P) :- N>0, N1 is N-1, pow(N1,P1), P is 2*P1.
```

Briefly explain how this program can be made more efficient without using divide-and-conquer.

Write a program to implement your solution. The first two clauses are given for you.

```
powA(N,P) :- powA(N,1,P).
```

**Answer** Use an accumulator and make the program tail-recursive.

```
powA(0,A,A).  
powA(N,A,P) :- N > 0, N1 is N-1, A1 is 2*A,  
                powA(N1,A1,P).
```