HW1

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Question 1

$$S(p) = \frac{T(n,1)}{T(n,p)} = \frac{\frac{x}{k-m}}{\frac{x}{p*k-m}} = \frac{p*k-m}{k-m} > p$$

The reason is that the snow accumulates with the time.

Question 2

$$S(p) = \frac{T(n,1)}{T(n,p)} = 1/p + 1/n$$

- fixed n, p continually increase: the speedup continually increases
- n is proportional to p: the speedup is fixed at 2k/n

Question 3

- if $P < n^2$, then both algorithms do not lose efficiency. With $T_A = \frac{n^3}{P} \times log(n$ and $T_B = \frac{n^2}{p} \times n$, so B is always faster
- if $n^2 < P < n^3$ $T_B = n$ and $T_A = \frac{n^3}{p} \times log(n)$, so A is faser
- if $p > n^3$ $T_A = log(n)$ and $T_B = n$

Question 4

(a) $E = \frac{n^2}{p(\frac{n^2}{p} + pn)} = \Theta(1)$ so: $p = O(\sqrt{n})$

(b) to satisfy the memery requirement, $P\ O(n)$, if $p = O(\sqrt[n]{})$ as the effciency requires, the memory tends to be exceeded.

Question 5

$$E = \frac{n}{p(\frac{n}{p} + \sqrt{p}\log(p))} = \Theta(1)$$

$$thus : p\sqrt{p}\log p = O(n)$$

Guess

$$P = O(\frac{n^{\frac{2}{3}}}{logn^{\frac{2}{3}}})$$

Subsititute

$$\frac{n^{\frac{2}{3}}}{\log n}^{\frac{3}{2}} \times (\log n^{\frac{2}{3}} - \log\log n^{\frac{3}{2}}) = O(1)$$