Problem 3:

T(n)=T(n)+1 if n>2 and T(n)=0 otherwise

$$T(n) = T(\sqrt{n}) + 1$$

$$T(n^{\frac{1}{2}}) = T(n^{\frac{1}{2}}) + 1$$

$$T(n^{\frac{1}{4}}) = T(n^{\frac{1}{4}}) + 1 + 1$$

$$T(n) = T(n^{\frac{1}{8}}) + 1 + 1 + 1$$

$$T(n) = T(n^{\frac{1}{2^k}}) + k$$

$$2 \geq n^{\frac{1}{2^k}}$$

$$log(2) \geq log(n^{\frac{1}{2^k}})$$

$$log(2) \geq \frac{1}{2^k} log(n)$$

$$\frac{log(2)}{log(n)} \geq \frac{1}{2^k}$$

$$\frac{log(n)}{log(2)} \leq 2^k$$

$$log(n) \leq 2^k$$

$$log(log(n)) \leq k\, log2$$

$$log(log(n)) \leq k$$

Therefore,

$$T(n) = \theta(log(log(n)))$$