Question 1: Powers of 2

Write a function \(\text{powers2 start count}\) that returns a \((\text{listof Int})\) containing \(\text{count}\) powers of two where the first value is \(2^{\text{start}}\).

\(\text{powers2 3 4}) \Rightarrow (\text{list 8 16 32 64})\)

Hint: Read the documentation on \textit{expt}.

Using \text{powers2} as a helper, write a function \((\text{total-powers start count})\) that returns the sum of the \(\text{count}\) powers of two where the first value is \(2^{\text{start}}\).

\(\text{total-powers 3 4}) \Rightarrow 120\)

Question 2: Countdown

Write a function \((\text{countdown n})\) that returns a \(\text{Str}\) depicting a countdown from \(\text{n}\), with "... " between the values, and ending with "blastoff!".

\(\text{countdown 5}) \Rightarrow "5... 4... 3... 2... 1... blastoff!"\)

Hint: You will need to use range, map, and foldr on this question. You will need to write a helper function to use with map.

Question 3: Multiply by position

Write a function \((\text{multipos L})\) that consumes a \((\text{listof Int})\). It returns a \((\text{listof Int})\) where the first item has been multiplied by 1, the second by 2, the third by 3, and so on.

\(\text{multipos (list 1 1 1}) \Rightarrow (\text{list 1 2 3})\)
\(\text{multipos (list 2 3 5 7}) \Rightarrow (\text{list 2 6 15 28})\)

Question 4: Length to power

Write a function \((\text{l2p L})\) that consumes a \((\text{listof Any})\). It returns 2 to the power of the length of the list.

\(\text{l2p (list 17 42 "foobar"}) \Rightarrow 8\)
\(\text{l2p '()} \Rightarrow 1\)

Do not use \textit{expt} or \textit{length} on this question.

Hint: Use foldr.