Instructions:

• All code is to use the Beginning Student with List Abbreviations language.
• Individual questions will indicate which design recipe components must be included for full marks. Unless otherwise specified, you can assume the following:
  – Helper functions require the function definition, contract and purpose but not examples or tests.
  – Examples and tests must use check-expect. Unless otherwise allowed, they must be different from any examples supplied in the question. Examples also count as test cases.
  – Contracts and data definitions are expected to include any necessary requires clauses.
• Your functions do not have to check for values not specified by the contract unless we ask you to do so.
• Functions you write may use:
  – Any helper function you have written in another part of the same question.
  – Any function we asked you to write for a previous part of the same question (even if you didn’t do that part).
  – cons, cons?, empty, empty?, first, second, third, rest, list, append, length, and member?.
  – reverse is not needed for any question and should not be used.
  – Any type predicate such as number?, integer?, boolean?, symbol?, and so on.
  – Any built-in mathematical function.
  – Any other built-in function or special form discussed in the course slides, unless specifically noted in the question. You are not allowed to use if in any of your solutions.
• Unless otherwise specified, for questions where you are required to provide a value, you may use either cons, list, or quoted list notation. For stepper questions, switching between these notations does not count as a “step”.
• All of the questions on this exam can be solved with pure structural recursion, but you will not be penalized if you use structural recursion with an accumulator or generative recursion.
• Throughout the exam, you should follow good programming practices as outlined in the course such as appropriate use of constants, meaningful identifier names, and helper functions.
• If you believe there is an error in the exam, notify a proctor. An announcement will be made if a significant error is found.
• It is your responsibility to properly interpret a question.
  – Do not ask questions regarding the interpretation of a question; it will not be answered and you will only disrupt your neighbours.
  – If there is a non-technical term you do not understand, you may ask for a definition.
  – If, despite your best efforts, you are still confused about a question, state your assumptions and proceed to the best of your abilities.
• If you require more space to answer a question, you may use the blank page(s) at the end of this exam, but you must clearly indicate in the provided answer space that you have done so.