Sets of distinct integers can be implemented in ML as values of type \texttt{set} declared below:

\[
\text{datatype set} = \text{Leaf} \mid N \text{ of set * int * set};
\]

Describe how you would use this data type to represent sets. \[\text{[4 marks]}\]

Give simple definitions for the following functions:

\(a\) \text{ insert: int*set->set}\]
Returns a set containing the given integer as well as all the elements of the given set; \[\text{[4 marks]}\]

\(b\) \text{ mkset: int list->set}\]
Creates a set containing all the integers from the given list; \[\text{[3 marks]}\]

\(c\) \text{ mklist: set->int list}\]
Makes a list of all the integers present in the given set; \[\text{[3 marks]}\]

\(d\) \text{ union: set*set->set}\]
Forms a set from all integers in the two arguments, avoiding the introduction of repeated entries; \[\text{[3 marks]}\]

\(e\) \text{ select : set->int*set}\]
Returns an arbitrary integer from the set, and also the set with that item removed. \text{select} should raise an exception if the given set is empty. \[\text{[3 marks]}\]

Your definitions should aim for simplicity and elegance rather than efficiency.