## Rna motivation

RNA is made up of strands of four different bases that encode genomic information in specific ways. The bases are elements of the set  $B = \{A, C, U, G\}$ . Strands are ordered nonempty finite sequences of bases.

Formally, to define the set of all RNA strands, we need more than roster method or set builder descriptions.

## Recursive sets definition

New! Recursive Definitions of Sets: The set S (pick a name) is defined by:

Basis Step: Specify finitely many elements of S

Recursive Step: Give rule(s) for creating a new element of S from known values existing in S,

and potentially other values.

The set S then consists of all and only elements that are put in S by finitely many (a nonnegative integer number) of applications of the recursive step after the basis step.

## Set recursive examples

<b>Definition</b> The set of nonnegative integers $\mathbb{N}$ is defined (recursively) by:
Basis Step: Recursive Step:
Examples:
<b>Definition</b> The set of all integers $\mathbb{Z}$ is defined (recursively) by:
Basis Step: Recursive Step:
Examples:
<b>Definition</b> The set of RNA strands $S$ is defined (recursively) by:
Basis Step: $A \in S, C \in S, U \in S, G \in S$ Recursive Step: If $s \in S$ and $b \in B$ , then $sb \in S$
where $sb$ is string concatenation.
Examples:
<b>Definition</b> The set of bitstrings (strings of 0s and 1s) is defined (recursively) by:
Basis Step: Recursive Step:
Notation: We call the set of bitstrings $\{0,1\}^*$ and we say this is the set of all strings over $\{0,1\}$ .
Examples: