

## Rna def

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

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

**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.

**Definition** The set of nonnegative integers  $\mathbb{N}$  is defined (recursively) by:

|                 |  |
|-----------------|--|
| Basis Step:     |  |
| Recursive Step: |  |

Examples:

**Definition** The set of all integers  $\mathbb{Z}$  is defined (recursively) by:

|                 |  |
|-----------------|--|
| Basis Step:     |  |
| Recursive Step: |  |

Examples:

**Definition** The set of RNA strands  $S$  is defined (recursively) by:

|                 |  |
|-----------------|--|
| Basis Step:     | $\mathbf{A} \in S, \mathbf{C} \in S, \mathbf{U} \in S, \mathbf{G} \in S$ |
| Recursive Step: | If $s \in S$ and $b \in B$ , then $sb \in S$                             |

where  $sb$  is string concatenation.

Examples:

**Definition** The set of bitstrings (strings of 0s and 1s) is defined (recursively) by:

|                 |  |
|-----------------|--|
| Basis Step:     |  |
| Recursive Step: |  |

*Notation:* We call the set of bitstrings  $\{0, 1\}^*$ .

Examples: