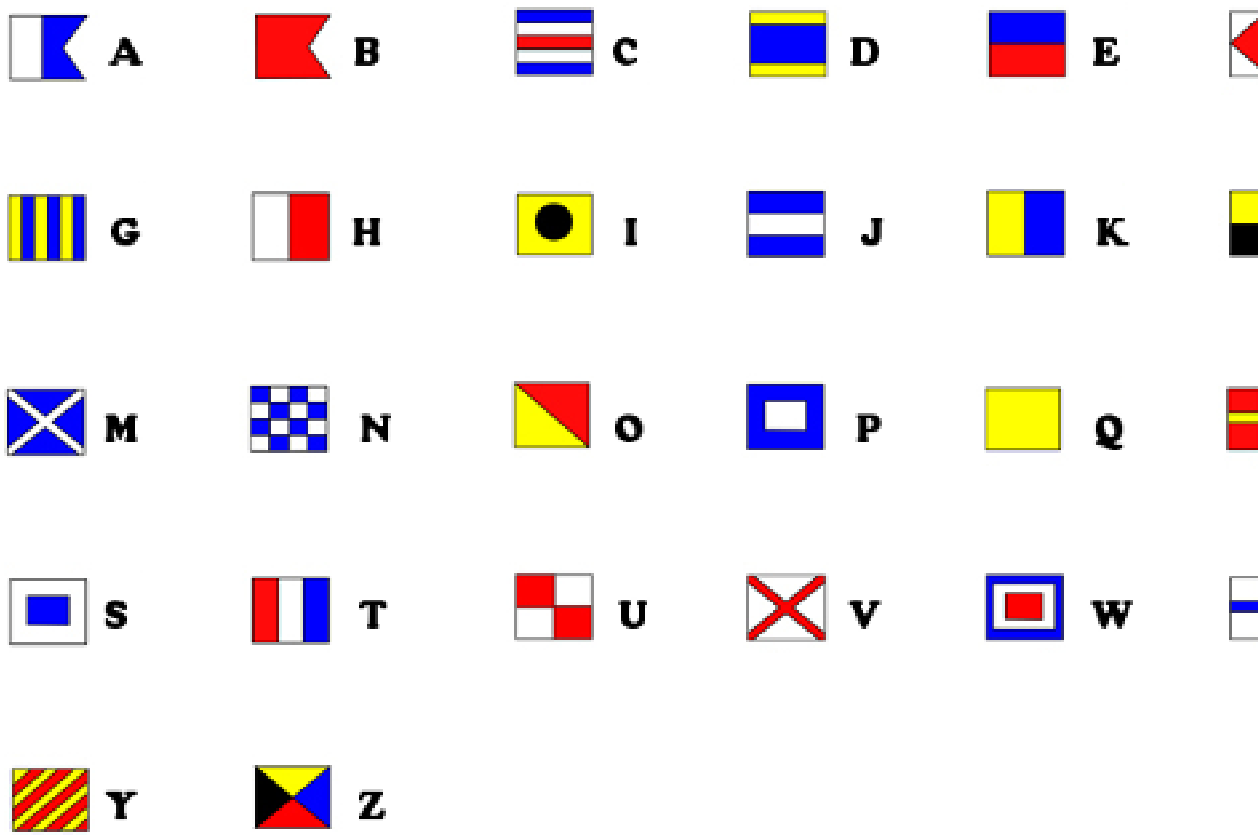
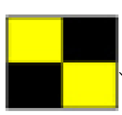
Definition 1. *The map below defines the **Flags** relation.*



*The **Flags** relation includes three sets:*

- *The domain consists of the 26 flags in the table.*
- *The codomain consists of the 26 letters in the English alphabet.*
- *A set of ordered pairs. The pair (flag, letter) is a member of the Flags relation if the table pairs the flag and letter.*

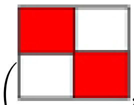
Exercise 1 $\Big($*L*,  $\Big) \in$ *Flags*

Multiple Choice:

(a) *True*

(b) *False* ✓

Feedback (attempt): *(flag, letter)*

Exercise 2 $\Big($$, U\Big) \in$ *Flags*

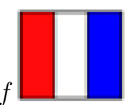
Multiple Choice:

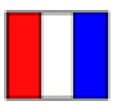
(a) *True* ✓

(b) *False*

Feedback (attempt): *(flag, letter)*

Definition 2. *The value of a function at a particular domain element is also called the* ***image*** *of the domain element.*

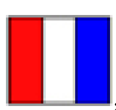
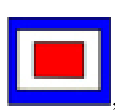
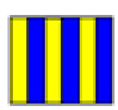
Example 1. *The image of*  *under the Flags function is T.*

Flags$\Big($$\Big) = T$

Definition 3. *The domain of the Flags function includes 26 flags. The domain is a* ***set****. A separate collection of some of these flags would form a* ***subset*** *of the domain.*

Suppose D is a subset of the domain.

The ***Image*** *of D would be the subset of the range consisting of the images of all of the elements of D. The image of D under the Flags function is written as Flags(D).*

Exercise 3 *Let SomeFlags* $= \Big\{$, , $\Big\}$

Determine Flags(SomeFlags)

Select All Correct Answers:

(a) X

(b) T✓

(c) B

(d) G✓

(e) W✓

Feedback (attempt): *The image is the subset { T, W, G }*

Definition 4. *The range of the Flags function includes 26 letters.*

Suppose R is a subset of the domain.

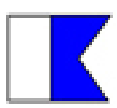
*The **Preimage** of R would be the subset of the domain consisting of the flags whose image is an element of R. The preimage of R under the Flags function is written as $Flags^{-1}(R)$.*

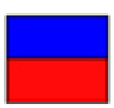
The -1 exponent generally invokes the ideas of inverse, reverse, backwards, upside-down, or generally opposite.

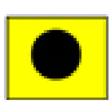
Exercise 4 *Let SomeLetters = { letter — letter is a vowel }*

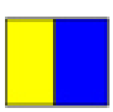
Determine $Flags^{-1}(SomeLetters)$

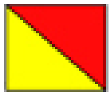
Select All Correct Answers:

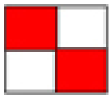
(a)  ✓

(b)  ✓

(c)  ✓

(d) 

(e)  ✓

(f)  ✓

Feedback (attempt): *The preimage is the set of flags corresponding to* { A, E, I, O , U }.