Cody Problem 29. Nearest Numbers

Given a row vector of numbers, find the indices of the two nearest numbers.

Examples:

```
% [index1 index2] = nearestNumbers([2 5 3 10 0 -3.1])
%
%  index1 =
%       1
%  index2 =
%       3
%
%  [index1 index2] = nearestNumbers([-40 14 22 17])
%
%  index1 =
%       2
%  index2 =
%       4
```

Notes

1. The indices should be returned in order such that index2 > index1.
2. There will always be a unique solution.

Scratch Pad

```
A = [2 5 3 10 0 -3.1]
```

```
A = 1×6
    2.0000    5.0000    3.0000   10.0000         0   -3.1000
```

```
[index1, index2] = nearestNumbers(A)
```

```
index1 = 1
index2 = 3
```

```
A = [-40 14 22 17]
```

```
A = 1×4
   -40    14    22    17
```

```
[index1, index2] = nearestNumbers(A)
```

```
index1 = 2
index2 = 4
```

Solution

```
function [index1 index2] = nearestNumbers(A)
    % Calculate absolute differences between all pairs of elements
    differences = abs(A - A.');

    % Set the diagonal elements to Inf to avoid comparing elements with
themselves
    differences(1:length(A)+1:end) = Inf;

    % Get the size of the matrix
    [m, n] = size(differences);

    % Create a logical mask to identify the elements below the primary
diagonal
    mask = tril(true(m, n), -1);

    % Set the elements below the primary diagonal to Infinity
    differences(mask) = Inf;

    [index1, index2] = find(differences == min(differences(:)));

end
```