



# EXERCISES — Lowest Common Ancestor

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version #7be580532266ed398481e31366afcc24b1950c2a



**The way is lit. The path is clear.  
We require only the strength to follow it.**

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## File Tree

```
lca/
├── lca.c  (to submit)
└── lca.h  (to submit)
```

**Authorized functions** : You are only allowed to use the following functions

- malloc(3)
- calloc(3)
- free(3)
- realloc(3)

**Authorized headers** : You are only allowed to use the functions defined in the following headers

- err.h
- errno.h
- assert.h
- stddef.h

**Compilation** : Your code must compile with the following flags

- -std=c99 -pedantic -Werror -Wall -Wextra -Wvla

**Main function** : None

## 1 Goal

In this exercise, you will find the lowest common ancestor (LCA) of two given values in a tree, represented by an array.

The lowest common ancestor between two nodes  $p$  and  $q$  of a tree is the lowest (or deepest) node in this tree that has both  $p$  and  $q$  as descendants. We consider a node to be a descendant of itself (i.e. the ancestor of a node with itself is itself).

Write the following function:

```
int lca(int *values, int length, int p, int q);
```

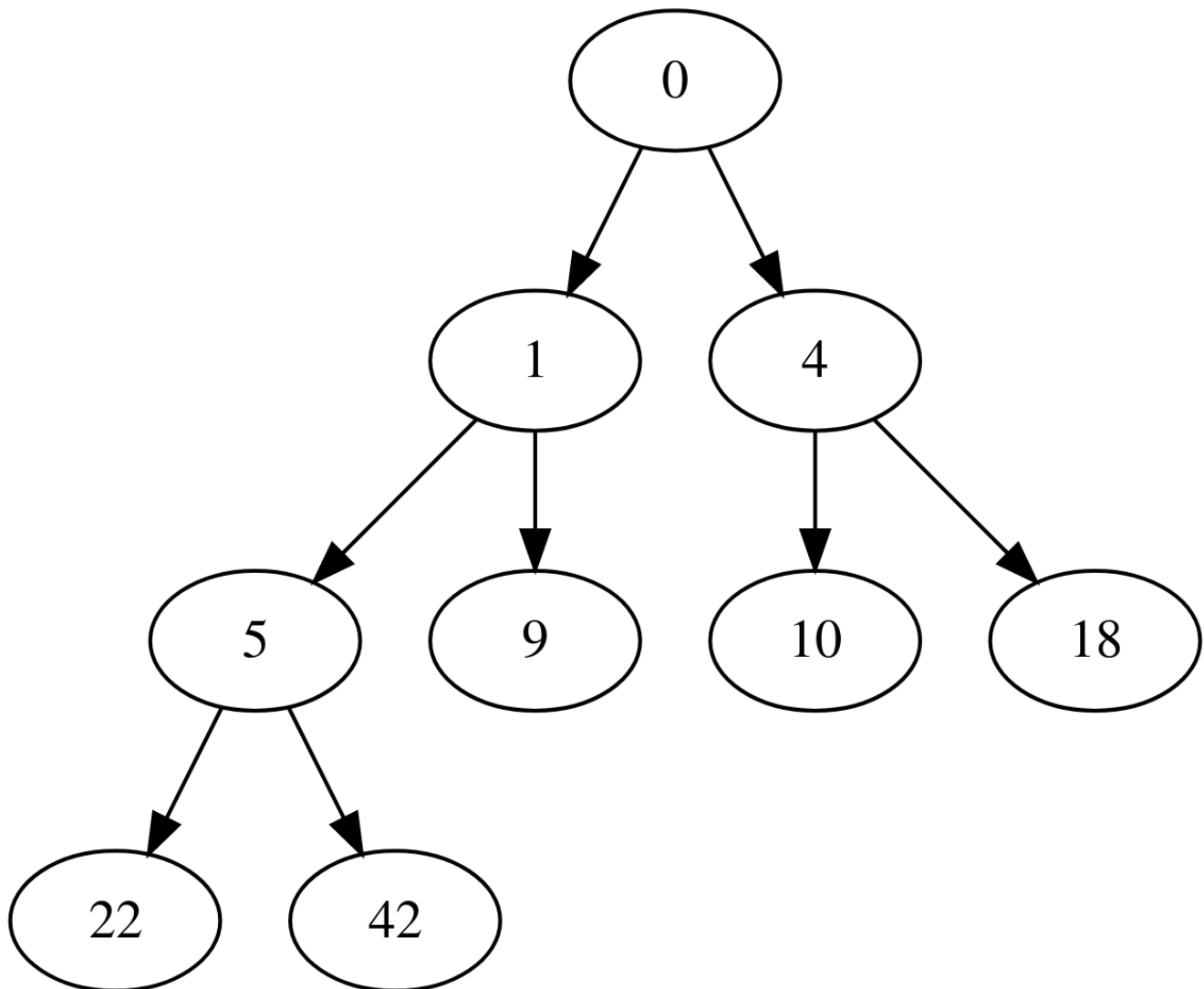
This function must return the LCA of parameters  $p$  and  $q$  from the int array parameter `values`. You can assume that all integers contained in the array will be unique and that  $p$  and  $q$  are present in the array. We are expecting a value, not an index.

### Tips

Trees given as argument will always be complete.

## 2 Example

For the following image the LCA between 9 and 10 is 0.



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