



Starfleet Interview

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Summary: This document is an interview question for the Starfleet Piscine.

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Chapter I

General rules

- The interview should last between 45 minutes.
- Both the interviewer and the interviewed student must be present.
- The interviewed student should write his code using a **whiteboard**, with the language of her/his choice.
- At the end of the interview, the interviewer evaluates the student based on the provided criteria.

Read carefully the interview question and solutions, and make sure you **understand** them before the interview. You can't share this document with other students, as they might be interviewed on the same question. Giving them the answer would prevent them from having to solve an unknown question during an interview.

I.1 During the interview

During the interview, we ask you to :

- Make sure the interviewed student **understands** the question.
- Give her/him any **clarification** on the subject that she/he might need.
- Let her/him come up with a solution before you guide her/him to the best solution given the constraints (time and space).
- Ask the student what is the **complexity** of her/his algorithm ? Can it be improved and how ?
- **Guide** her/him to the best solution without giving the answer. You may refer to the **hints** for that.
- You want to evaluate how the interviewed student thinks, so ask her/him to **explain everything** that she/he thinks or writes (there should be no silences).
- If you see a mistake in the code, wait untill the end and give her/him a chance to correct it by her/himself.
- Ask the student to show how the algorithm works on an **example**.
- Ask the student to explain how **limit cases** are handled.
- Bring out to the student any mistake she/he might have done.
- Give **feedback** on her/his performances after the interview.
- Be **fair** in your evaluation.

As always, stay mannerly, polite, respectful and constructive during the interview. If the interview is carried out smoothly, you will both benefit from it !

Chapter II

Assination

II.1 Interview question

Given 3 integers 'a', 'b', and 'x', where 'x' can only be either 0 or 1, return 'a' if 'x' is 0 and 'b' if 'x' is one.

You are not allowed to use any conditional operators (including ternary operator).

Note : The value of 'x' will always be either 0 or 1.

II.2 Acceptable answers (no constraint)

II.2.1 With arithmetic operators

A simple solution is to use arithmetic operators.

```
0(1) time , 0(1) space
```

code:

```
int assination(int x, int a, int b) {  
    return ((1 - x) * a + x * b);  
}
```

II.2.2 With bitwise operators

Another solution is to use bitwise operators.

`O(1) time , O(1) space`

code:

```
int assignation(int x, int a, int b) {  
    x -= 1;  
    return ((a & x) | (b & ~x));  
}
```

II.3 Follow up question

Solve the problem without using arithmetic or bitwise operator ('+', '-', '*', '/', '&', '^', ...).

II.3.1 Hints

- Why not use a really small hash table?

II.4 Best solutions

II.4.1 With a hash table

The problem can easily be solved with a hash table.

`O(1) time , O(1) space`

code:

```
int assignation(int x, int a, int b) {  
    int ht[] = {a, b};  
    return ht[x];  
}
```