

RECRUITMENT TEST (C++/BACK END DEVELOPER)

Instruction: Please answer the following questions to the best of your ability and return your solutions to X-Formation for review.

Note: (*) indicates an extra task that is not required

1. There are at least 4 different bugs in the implementation of the following Array class. For at least 2 of them could you please:

I. Provide a test case for each bug.

II. Propose a fix for each bug (please provide us with fixed implementation in array.h file).

III. (*) Assuming we have a bug-free implementation of Array class, do you think there are any design problems with it?

```
#include <new>
#include <cstddef>

using std::nothrow;

template <class T>
class Array
{
private:
    T *m_pData;
    unsigned int m_nSize;

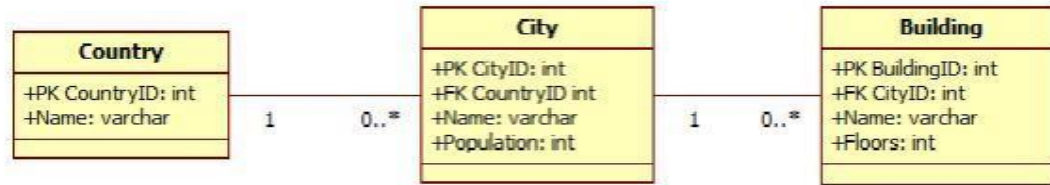
public:
    Array(unsigned int nSize) : m_nSize(nSize)
    {
        if(m_nSize > 0)
            m_pData = new (nothrow) T[m_nSize];
    }

    virtual ~Array()
    {
        if(m_pData != NULL) delete m_pData;
    }
};
```

```
bool Set(unsigned int nPos, const T& Value)
{
    if(nPos < m_nSize)
    {
        m_pData[nPos]= Value;
        return true;
    }
    else
        return false;
}

T Get(unsigned int nPos)
{
    if(nPos < m_nSize)
        return m_pData[nPos];
    else
        return T();
}
};
```

2. Consider the following physical data model:



Write an SQL query that:

- I. Selects names of all buildings in Poland.
- II. Selects countries where a total number of inhabitants (population) in all the cities is greater than 400.
- III. (*) Selects names of countries that have no buildings at all.

Notice

Please write code in separate files. We would very much appreciate it if you follow these guidelines on file naming conventions when providing you answers:

- array.h and array_test.cpp for the answers to #1 task, with the first one involving fixed implementation and the second one testing the ability to fix bugs
- queries.sql for the answers to #2 task
- *.txt or *.md for any documentation, comments, explanations or discussion regarding the tasks done

For your best convenience, please deliver your answers via private gist (gist.github.com). To do this, simply create one, create files with answers and share the link with us. If you prefer more traditional methods, you may want to just archive them and send to us as an attachment to email.