

Test task for C/C++ developers before applying for a technical interview in Nokia

Estimation time: not more than 90 minutes.

Send results as compilable code for gcc or clang with respective make or configuration files for Linux or compatible systems. Use reasonably modern compiler versions (gcc 8+, clang 8+). C standard up to C18. C++ standard up to C++17. Use GNU make, GNU autotools or CMake. Windows users may consider WSL or MinGW64 to verify compilation.

Depending on position you apply for, try to demonstrate your embedded programming skills, C or C++ language features and standard library knowledge, ability to write maintainable code. Unit tests that verify implementation to satisfy the task are recommended. Use some well-known framework such as CppUTest or GoogleTest (provide version used).

1. Write a function that calculates the first N prime numbers and put these numbers in the array passed to it.
2. Write a function that counts the number of words in the text for each word length (X words with 1-letter length, Y words with 2-letters length, etc.)
3. There is a list:

```
struct List {  
    struct List* next;  
    SomeDataType payload;  
}
```

Write a function that removes every fifth (5) element from this list.

4. Write a function that takes a 32-bit unsigned integer number and returns the maximum and minimum 32-bit unsigned integer numbers which can be obtained using the same number of bits set to 1 as in the taken number.
5. There is a binary tree:

```
struct TreeNode {  
    struct TreeNode* leftChild;  
    struct TreeNode* rightChild;  
}
```

Write a function that calculates the depth of the tree (the maximum number of nodes in the path from the root to the leaf). The **solution shall return all paths** in the tree that have such depth.