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Max Min

by amititkgp

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You will be given a list of integers, arr, and a single integer k. You must create an array of length k from elements of arr such that its *unfairness* is minimized. Call that array $subarr$. Unfairness of an array is calculated as

$$max(subarr) - min(subarr)$$

Where:
- *max* denotes the largest integer in $subarr$.
- *min* denotes the smallest integer in $subarr$.

As an example, consider the array $[1, 4, 7, 2]$ with a k of 2. Pick any two elements, test $subarr = [4, 7]$.
$unfairness = max(4, 7) - min(4, 7) = 7 - 4 = 3$
Testing for all pairs, the solution $[1, 2]$ provides the minimum unfairness.

Note: Integers in arr may not be unique.

Input Format

The first line contains an integer n, the number of elements in array arr.
The second line contains an integer k.
Each of the next n lines contains an integer arr_i where $0 \leq i < n$.

Constraints

$2 \leq n \leq 10^5$
$2 \leq k \leq n$
$0 \leq arr_i \leq 10^9$

Output Format

An integer that denotes the minimum possible value of *unfairness*.

Sample Input 0

```
7
3
10
100
300
200
1000
20
30
```

Sample Output 0

```
20
```

Explanation 0

Here $K = 3$; selecting the 3 integers $10, 20, 30$, unfairness equals

```
max(10,20,30) - min(10,20,30) = 30 - 10 = 20
```

Sample Input 1

```
10
4
1
2
3
4
10
20
30
40
100
200
```

Sample Output 1

```
3
```

Explanation 1

Here $K = 4$; selecting the 4 integers $1, 2, 3, 4$, unfairness equals

```
max(1,2,3,4) - min(1,2,3,4) = 4 - 1 = 3
```

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Suggest Edits

Current Buffer (saved locally, editable) C++14

```cpp
/** Terminated due to timeout */
#include <iterator>
#include <vector>
#include <iostream>
#include <algorithm>
#include <limits>
#define speed std::ios_base::sync_with_stdio(false); std::cin.tie(nullptr); std::cout.tie(nullptr)
typedef unsigned long long int uint64;

int main()
{
    speed;
    uint64 N; std::cin>>N;
    uint64 k; std::cin>>k;
    std::vector<uint64> vec;
    vec.reserve(N);
    std::copy_n(std::istream_iterator<uint64>(std::cin), N, back_inserter(vec));
    std::sort(vec.begin(), vec.end());

    uint64 answer = std::numeric_limits<uint64>::max();
    for(size_t i=0; i<=N-k; ++i)
    {
        auto MAX =  vec[i+k-1];
        auto MIN =  vec[i];
        answer = std::min( answer, (MAX - MIN) );
        //std::cout<<answer<<" "<<MIN<<" "<<MAX<<" "<<i<<"\n";
    }
    std::cout<<answer<<std::endl;
    return 0;
}

```

Line: 31 Col: 1

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✔ Test Case #6	✔ Test Case #7	✔ Test Case #8
✔ Test Case #9	✔ Test Case #10	✔ Test Case #11
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