

```
1 // COS30008, Problem Set 1/3, 2024
2
3 #include "Combination.h"
4
5 Combination::Combination(size_t aN, size_t aK) :
6     fN(aN), fK(aK)
7 { }
8
9 size_t Combination::getN() const
10 {
11     return fN;
12 }
13
14 size_t Combination::getK() const
15 {
16     return fK;
17 }
18
19 unsigned long long Combination::operator()() const
20 {
21     if (fK > fN)
22     {
23         return 0;
24     }
25
26     unsigned long long result = 1;
27
28     size_t lK = fK;
29
30     if (fK > fN / 2)
31     {
32         // this will reduce the number of iterations by choosing the
33         // smaller k
34         lK = fN - fK;
35     }
36
37     for (size_t i = 1; i <= lK; i++)
38     {
39         result *= fN - i + 1;
40         result /= i;
41     }
42
43     return result;
44 }
```