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// Code for first assignment

// Generate an array with 100 random numbers in the range of 1-10000

// The code then computes/checks if the number is odd/even, prime, factorial, prefix sum, average (use function calling function concept)

```
#include <iostream>
#include <vector>
#include <cstdlib>
#include <ctime>
#include <cmath>

using namespace std;

vector<int> generateRandomNumbers(int size, int min, int max) {
vector<int> numbers(size);
for (int i = 0; i < size; ++i) {
numbers[i] = rand() % (max - min + 1) + min;
}
return numbers;
}

bool isOdd(int number) {
return number % 2 != 0;
}

bool isEven(int number) {
return number % 2 == 0;
}

bool isPrime(int number) {
if (number <= 1) return false;
for (int i = 2; i <= sqrt(number); ++i) {
if (number % i == 0) return false;
}
return true;
}

double factorial(int number) {
```

```
if (number == 0) return 1;
double fact = 1;
for (double i = 1; i <= number; ++i) {
fact *= i;
}
return fact;
}

vector<int> computePrefixSum(const vector<int>& numbers) {
vector<int> prefixSum(numbers.size());
prefixSum[0] = numbers[0];
for (int i = 1; i < numbers.size(); ++i) {
prefixSum[i] = prefixSum[i - 1] + numbers[i];
}
return prefixSum;
}

double computeAverage(const vector<int>& numbers) {
int sum = 0;
for (int i = 0; i < numbers.size(); ++i) {
sum += numbers[i];
}
return static_cast<double>(sum) / numbers.size();
}

int main() {
srand(time(0));
vector<int> numbers = generateRandomNumbers(100, 1, 10000);
for (int i = 0; i < numbers.size(); ++i) {
cout << "Number: " << numbers[i] << " | ";
cout << (isOdd(numbers[i]) ? "Odd" : "Even") << " | ";
cout << (isPrime(numbers[i]) ? "Prime" : "Not Prime") << " | ";
cout << "Factorial: " << factorial(numbers[i]) << endl;
}
vector<int> prefixSum = computePrefixSum(numbers);
double average = computeAverage(numbers);
cout << "Prefix Sum: ";
for (int i = 0; i < prefixSum.size(); ++i) {
cout << prefixSum[i] << " ";
}
cout << endl;
cout << "Average: " << average << endl;
return 0;
}
```

Output Of C++ Code :

```
Number: 8532 | Even | Not Prime | Factorial: inf
Number: 1645 | Odd | Not Prime | Factorial: inf
Number: 3378 | Even | Not Prime | Factorial: inf
Number: 4717 | Odd | Not Prime | Factorial: inf
Number: 4949 | Odd | Not Prime | Factorial: inf
Number: 9763 | Odd | Not Prime | Factorial: inf
Number: 460 | Even | Not Prime | Factorial: inf
Number: 1834 | Even | Not Prime | Factorial: inf
Number: 127 | Odd | Prime | Factorial: 3.01266e+213
Number: 1952 | Even | Not Prime | Factorial: inf
Number: 4831 | Odd | Prime | Factorial: inf
Number: 1409 | Odd | Prime | Factorial: inf
Number: 9665 | Odd | Not Prime | Factorial: inf
Number: 8166 | Even | Not Prime | Factorial: inf
Number: 8337 | Odd | Not Prime | Factorial: inf
Number: 7533 | Odd | Not Prime | Factorial: inf
Number: 6793 | Odd | Prime | Factorial: inf
Number: 508 | Even | Not Prime | Factorial: inf
Number: 1799 | Odd | Not Prime | Factorial: inf
Number: 2436 | Even | Not Prime | Factorial: inf
Number: 645 | Odd | Not Prime | Factorial: inf
Number: 5455 | Odd | Not Prime | Factorial: inf
Number: 6217 | Odd | Prime | Factorial: inf
Number: 6126 | Even | Not Prime | Factorial: inf
Number: 4664 | Even | Not Prime | Factorial: inf
Number: 7549 | Odd | Prime | Factorial: inf
Number: 6248 | Even | Not Prime | Factorial: inf
Number: 8973 | Odd | Not Prime | Factorial: inf
Number: 7869 | Odd | Not Prime | Factorial: inf
Number: 5446 | Even | Not Prime | Factorial: inf
Number: 4961 | Odd | Not Prime | Factorial: inf
Number: 2752 | Even | Not Prime | Factorial: inf
Number: 7091 | Odd | Not Prime | Factorial: inf
Number: 4690 | Even | Not Prime | Factorial: inf
Number: 3820 | Even | Not Prime | Factorial: inf
Number: 8391 | Odd | Not Prime | Factorial: inf
Number: 805 | Odd | Not Prime | Factorial: inf
Number: 4279 | Odd | Not Prime | Factorial: inf
Number: 225 | Odd | Not Prime | Factorial: inf
Number: 931 | Odd | Not Prime | Factorial: inf
Number: 6230 | Even | Not Prime | Factorial: inf
Number: 1407 | Odd | Not Prime | Factorial: inf
Number: 8691 | Odd | Not Prime | Factorial: inf
Number: 2247 | Odd | Not Prime | Factorial: inf
Number: 9572 | Even | Not Prime | Factorial: inf
Number: 7027 | Odd | Prime | Factorial: inf
Number: 9779 | Odd | Not Prime | Factorial: inf
Number: 6364 | Even | Not Prime | Factorial: inf
Number: 7535 | Odd | Not Prime | Factorial: inf
Number: 7929 | Odd | Not Prime | Factorial: inf
```

```
Number: 6903 | Odd | Not Prime | Factorial: inf
Number: 3371 | Odd | Prime | Factorial: inf
Number: 3135 | Odd | Not Prime | Factorial: inf
Number: 2349 | Odd | Not Prime | Factorial: inf
Number: 4684 | Even | Not Prime | Factorial: inf
Number: 2238 | Even | Not Prime | Factorial: inf
Number: 5791 | Odd | Prime | Factorial: inf
Number: 9373 | Odd | Not Prime | Factorial: inf
Number: 6057 | Odd | Not Prime | Factorial: inf
Number: 4181 | Odd | Not Prime | Factorial: inf
Number: 177 | Odd | Not Prime | Factorial: inf
Number: 6687 | Odd | Not Prime | Factorial: inf
Number: 757 | Odd | Prime | Factorial: inf
Number: 7460 | Even | Not Prime | Factorial: inf
Number: 9269 | Odd | Not Prime | Factorial: inf
Number: 2164 | Even | Not Prime | Factorial: inf
Number: 6150 | Even | Not Prime | Factorial: inf
Number: 1515 | Odd | Not Prime | Factorial: inf
Number: 8087 | Odd | Prime | Factorial: inf
Number: 3177 | Odd | Not Prime | Factorial: inf
Number: 1293 | Odd | Not Prime | Factorial: inf
Number: 4451 | Odd | Prime | Factorial: inf
Number: 7063 | Odd | Not Prime | Factorial: inf
Number: 5573 | Odd | Prime | Factorial: inf
Number: 9601 | Odd | Prime | Factorial: inf
Number: 1593 | Odd | Not Prime | Factorial: inf
Number: 8956 | Even | Not Prime | Factorial: inf
Number: 7320 | Even | Not Prime | Factorial: inf
Number: 8600 | Even | Not Prime | Factorial: inf
Number: 3355 | Odd | Not Prime | Factorial: inf
Number: 2586 | Even | Not Prime | Factorial: inf
Number: 1855 | Odd | Not Prime | Factorial: inf
Number: 6725 | Odd | Not Prime | Factorial: inf
Number: 2073 | Odd | Not Prime | Factorial: inf
Number: 555 | Odd | Not Prime | Factorial: inf
Number: 1408 | Even | Not Prime | Factorial: inf
Number: 662 | Even | Not Prime | Factorial: inf
Number: 6345 | Odd | Not Prime | Factorial: inf
Number: 7133 | Odd | Not Prime | Factorial: inf
Number: 3071 | Odd | Not Prime | Factorial: inf
Number: 6877 | Odd | Not Prime | Factorial: inf
Number: 7309 | Odd | Prime | Factorial: inf
Number: 9757 | Odd | Not Prime | Factorial: inf
Prefix Sum: 8532 10177 13555 18272 23221 32984 33444 35278 35405 37357 42188 4359
7 53262 61428 69765 77298 84091 84599 86398 88834 89479 94934 101151 107277 11194
1 119490 125738 134711 142580 148026 152987 155739 162830 167520 171340 179731 18
0536 184815 185040 185971 192201 193608 202299 204546 214118 221145 230924 237288
 244823 252752 257903 262434 265818 267185 267841 275888 281155 288058 291429 294
564 296913 301597 303835 309626 318999 325056 329237 329414 336101 336858 344318
353587 355751 361901 363416 371503 374680 375973 380424 387487 393060 402661 4042
54 413210 420530 429130 432485 435071 436926 443651 445724 446279 447687 448349 4
54694 461827 464898 471775 479084 488841
Average: 4888.41
```