* **isPrime(int n):** returns true if n is prime, false otherwise.
* **getPrimes(int limit):** returns a list of all prime numbers up to a given limit.
* **getNthPrime(int n):** returns the nth prime number.
* **getPrimeFactors(int n):** returns a list of prime factors of n.
* **getDistinctPrimeFactors(int n):** returns a list of distinct prime factors of n.
* **countDistinctPrimeFactors(int n):** returns the number of distinct prime factors of n.
* **countPrimeFactors(int n):** returns the number of prime factors of n (including duplicates).
* **getPrimeFactorization(int n):** returns a map of prime factors and their exponents for n.
* **isPerfectSquare(int n):** returns true if n is a perfect square, false otherwise.
* **getGCD(int a, int b):** returns the greatest common divisor of a and b.
* **getLCM(int a, int b):** returns the least common multiple of a and b.
* **getTotientFunction(int n):** returns the value of Euler's Totient function for n.
* **getSumOfDivisors(int n):** returns the sum of all divisors of n.
* **countDivisors(int n):** returns the number of divisors of n.
* **getDivisors(int n):** returns a list of all divisors of n.
* **isAbundant(int n):** returns true if n is an abundant number, false otherwise.
* **isDeficient(int n):** returns true if n is a deficient number, false otherwise.
* **isPerfect(int n):** returns true if n is a perfect number, false otherwise.
* **isAmicable(int n):** returns true if n is an amicable number, false otherwise.
* **getAmicablePairs(int limit):** returns a list of all amicable number pairs up to a given limit.

1. **factorial(n)**: computes the factorial of the given integer n.
2. **is\_perm(a,b)**: checks if two integers a and b are permutations of each other (i.e., contain the same digits in any order).
3. **is\_palindromic(n)**: checks if the given integer n is a palindrome (i.e., reads the same forward and backward).
4. **is\_pandigital(n, s=9)**: checks if the given integer n contains all digits from 1 to s exactly once.
5. **d(n)**: calculates the sum of proper divisors of the given integer n.
6. **pal\_list(k)**: generates a list of all palindromic numbers with k digits.
7. **sof\_digits(n)**: calculates the sum of the factorials of the digits of the given integer n.
8. **fibonacci(n)**: finds the nth number in the Fibonacci series using the fast doubling Fibonacci algorithm.
9. **sos\_digits(n)**: calculates the sum of squares of the digits of the given integer n.
10. **pow\_digits(n, e)**: calculates the sum of the digits of the given integer n raised to the power e.
11. **is\_prime(n)**: checks if the given integer n is a prime number.
12. **miller\_rabin(n)**: performs the Miller-Rabin primality test on the given integer n.
13. **factor(n)**: finds the prime factors of the given integer n along with their frequencies.
14. **gcd(a, b)**: computes the greatest common divisor of the integers a and b.
15. **perm(n, s)**: finds the nth permutation of the characters in the string s.
16. **binomial(n, k)**: calculates the binomial coefficient C(n,k).
17. **catalan\_number(n)**: calculates the nth Catalan number.
18. **prime\_sieve(n)**: generates a list of all prime numbers less than n.
19. **bezout(a,b)**: finds the Bézout coefficients (u,v) of (a,b) such that a*u + b*v = gcd(a,b).
20. **dec2base(n, base)**: converts the given integer n to a string in the specified base.
21. **n2words(num, join=True)**: converts the given integer num to a string in words.