评分与评语：

**台州学院**

**电子与信息工程学院实验报告**

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实验课程： Java程序设计基础

实验项目： Experiment 2 Java Control Statements

**NOTE：**

**When pasting code, please do not use a black background. Otherwise, when the teacher prints your assignments at the end of the semester, it will be a mess of black.**

实验日期： 2025 年 3 月 26 日

**Project: Displaying Prime Numbers**

Problem Description:

Write a program that displays the first 50 prime numbers in five lines, each of which contains 10 numbers. An integer greater than 1 is prime if its only positive divisor is 1 or itself. For example, 2, 3, 5, and 7 are prime numbers, but 4, 6, 8, and 9 are not.

Solution:

The problem can be broken into the following tasks:

1. For number = 2, 3, 4, 5, 6, ..., test whether the number is prime.
2. Determine whether a given number is prime.
3. Count the prime numbers.
4. Print each prime number, and print 10 numbers per line.

Analysis:

* We need to find and display the first 50 prime numbers.
* A prime number is only divisible by 1 and itself.
* We start checking from 2, increasing one by one, until we find 50 prime numbers.
* We print them in 5 rows, with 10 numbers in each row.

Design:

* Start with number = 2 (smallest prime).
* Check if number is prime:
  + A prime number has no divisors other than 1 and itself.
  + Use a loop to test divisibility.
* Keep track of how many primes we found.
* Print 10 primes per line, then move to the next line.
* Repeat until we get 50 prime numbers.

Coding:

public class Main {

public static void main(String[] args) {

int count = 0; // Count how many primes we've found

int number = 2; // Start checking from 2

final int NUM\_PRIMES = 50; // Total primes to find

final int PRIMES\_PER\_LINE = 10; // Primes per row

while (count < NUM\_PRIMES) {

if (isPrime(number)) { // Check if number is prime

System.out.printf("%5d", number); // Print with spacing

count++;

if (count % PRIMES\_PER\_LINE == 0) { // New line after 10 numbers

System.out.println();

}

}

number++; // Check the next number

}

}

// Function to check if a number is prime

public static boolean isPrime(int num) {

if (num < 2) return false; // 1 is not prime

for (int i = 2; i \* i <= num; i++) { // Check up to sqrt(num)

if (num % i == 0) {

return false; // Found a divisor, not prime

}

}

return true; // No divisors found, it's prime

}

}

Testing:

* **Basic cases:** Run the program and check the output.
* **Manual verification:** The first few primes should be 2, 3, 5, 7, 11...
* **Edge cases:** The program correctly skips non-prime numbers like 4, 6, 8.
* **Output format:** It prints 10 numbers per line as required.