代码3

GitHub地址：https://github.com/HuaZhouyang/Course\_JavaProgramming

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**Unit 3:**

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***3-4 RandomMonth.java:***

package Unit\_3;

import java.util.Random;

public class \_04\_RandomMonth {

public static void main(String[] args) {

String[] months = new String[]{"January", "February", "March", "April", "May", "June", "July", "August", "September", "October", "November", "December"};

Random random = new Random(System.currentTimeMillis());

int month = random.nextInt(12);

System.out.println(months[month]);

}

}

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***3-9 CheckISBN10.java:***

package Unit\_3;

import java.util.Scanner;

public class \_09\_CheckISBN10 {

public static void main(String[] args) {

System.out.print("Enter the first 9 digits of an ISBN as integer: ");

Scanner scanner = new Scanner(System.in);

String \_9d = scanner.nextLine();

int sum = 0;

for (int i = 0; i < \_9d.length();) {

sum += (\_9d.charAt(i) - '0') \* ++i;

}

sum %= 11;

String d10 = sum == 10 ? "X" : String.valueOf(sum);

System.out.println("The ISBN-10 number is " + \_9d + d10);

}

}

/\*

Enter the first 9 digits of an ISBN as integer:

The ISBN-10 number is

\*/

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***3-15 Lottery.java:***

package Unit\_3;

import java.util.Scanner;

public class \_15\_Lottery {

public static void main(String[] args) {

// Generate a lottery number

int lottery = (int) (Math.random() \* 1000);

// int lottery = 123;

// Prompt the user to enter a guess

Scanner input = new Scanner(System.in);

System.out.print("Enter your lottery pick (three digits): ");

int guess = input.nextInt(), money = 10000;

System.out.println("The lottery number is " + lottery);

// check the guess

boolean[] lotteries = new boolean[10];

boolean[] guesses = new boolean[10];

while (lottery != 0) {

int l = lottery % 10, g = guess % 10;

if (l != g) money = 3000;

lotteries[l] = true;

guesses[g] = true;

lottery /= 10;

guess /= 10;

}

boolean flag = false;

for (int i = 0; i < 10; i++) {

if (lotteries[i] && lotteries[i] == guesses[i])

flag = true;

else if (lotteries[i] != guesses[i])

money = 1000;

}

if (flag) {

switch (money) {

case 10000:

System.out.println("Exact match: you win $10,000");

break;

case 3000:

System.out.println("Match all digits: you win $3,000");

break;

case 1000:

System.out.println("Match one digit: you win $1,000");

}

} else {

System.out.println("Sorry, no match");

}

}

}

/\*

Exact match: you win $10,000

Match all digits: you win $3,000

Match one digit: you win $1,000

Sorry, no match

\*/

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***3-19 CalculateTrianglePerimeter.java:***

package Unit\_3;

import java.util.Scanner;

public class \_19\_CalculateTrianglePerimeter {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

int a = scanner.nextInt(),

b = scanner.nextInt(),

c = scanner.nextInt();

if (a + b > c && a + c > b && b + c > a) {

System.out.println(a+b+c);

} else {

System.out.println("Invalid Input!");

}

}

}

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***3-21 DayOfWeek.java:***

package Unit\_3;

import java.util.Scanner;

public class \_21\_DayOfWeek {

public static void main(String[] args) {

Scanner sc = new Scanner(System.in);

System.out.println("Enter year: (e.g., 2012): ");

int y = sc.nextInt();

System.out.println("Enter month: 1-12:");

int m = sc.nextInt();

System.out.println("Enter the day of the month: 1-31:");

int q = sc.nextInt();

if (m <= 2) {

m = m + 12;

y = y - 1;

}

int j = y / 100, k = y % 100;

int h = (q + 26 \* (m + 1) / 10 + k + k / 4 + j / 4 + 5 \* j) % 7;

String[] week = new String[]{"Saturday", "Sunday", "Monday", "Tuesday", "Wednesday", "Thursday", "Friday"};

System.out.println("Day of the week is " + week[h]);

}

}

/\*

Enter year: (e.g., 2012):

Enter month: 1-12:

Enter the day of the month: 1-31:

Day of the week is

\*/

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***3-22 PointInsideCircle.java:***

package Unit\_3;

import java.util.Scanner;

public class \_22\_PointInsideCircle {

public static void main(String[] args) {

Scanner sc = new Scanner(System.in);

System.out.println("Enter a point with two coordinates: ");

float x = sc.nextFloat(), y = sc.nextFloat();

System.out.printf("Point (%.1f, %.1f) is", x, y);

if (x \* x + y \* y > 100) {

System.out.print(" not");

}

System.out.print(" in the circle");

}

}

/\*

Enter a point with two coordinates: 4 5

Point (4.0, 5.0) is in the circle

Enter a point with two coordinates: 9 9

Point (9.0, 9.0) is not in the circle

\*/

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***3-23 PointInsideRectangle.java:***

package Unit\_3;

import java.util.Scanner;

public class \_23\_PointInsideRectangle {

public static void main(String[] args) {

Scanner sc = new Scanner(System.in);

float x = sc.nextFloat(), y = sc.nextFloat();

System.out.printf("Point (%.1f, %.1f) is", x, y);

if (Math.abs(x) > 5 || Math.abs(y) > 2.5) {

System.out.print(" not");

}

System.out.print(" in the rectangle");

}

}

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***3-24 DrawCard.java:***

package Unit\_3;

import java.util.Random;

public class \_24\_DrawCard {

public static void main(String[] args) {

String[] scale = {

"Ace", "2", "3", "4", "5", "6", "7", "8", "9", "10", "Jack", "Queen", "King"};

String[] flower = {

"Clubs", "Diamonds", "Hearts", "Spades"};

int r1 = (int) (Math.random() \* 13);

int r2 = (int) (Math.random() \* 4);

System.out.println("The card you picked is " + scale[r1] + " of " + flower[r2]);

}

}

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***3-27 PointInsideTriangle.java:***

package Unit\_3;

import java.util.Scanner;

public class \_27\_PointInsideTriangle {

public static void main(String[] args) {

Scanner sc = new Scanner(System.in);

System.out.println("Enter a point’s x- and y-coordinates: ");

float x = sc.nextFloat(), y = sc.nextFloat();

System.out.print("The point is");

// y=-1/2x+100

// if (x <= 0 || x >= 200

// || y <= 0 || y >= -0.5 \* x + 100) {

if (!(y < -0.5 \* x + 100 && x > 0 && y > 0)) {

System.out.print(" not");

}

System.out.print(" in the triangle");

}

}

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***3-28 TwoRectangles.java:***

package Unit\_3;

import java.util.Scanner;

public class \_28\_TwoRectangles {

public static void main(String[] args) {

Scanner sc = new Scanner(System.in);

System.out.print("Enter r1’s center x-, y-coordinates, width, and height: ");

float x1 = sc.nextFloat(), y1 = sc.nextFloat();

float w1 = sc.nextFloat(), h1 = sc.nextFloat();

System.out.print("Enter r2’s center x-, y-coordinates, width, and height: ");

float x2 = sc.nextFloat(), y2 = sc.nextFloat();

float w2 = sc.nextFloat(), h2 = sc.nextFloat();

System.out.print("r2 ");

if (Math.abs(x1 - x2) > (w1 + w2) / 2.0 ||

Math.abs(y1 - y2) > (h1 + h2) / 2.0) {

// outside

System.out.print("does not overlap");

} else if (Math.abs(x1 - x2) < (w1 - w2) / 2.0 ||

Math.abs(y1 - y2) < (h1 - h2) / 2.0) {

// inside

System.out.print("is inside");

} else {

//overlap

System.out.print("overlaps");

}

System.out.print(" r1");

}

}

/\*

Enter r1’s center x-, y-coordinates, width, and height: 2.5 4 2.5 43

Enter r2’s center x-, y-coordinates, width, and height: 1.5 5 0.5 3

r2 is inside r1

r2 overlaps r1

r2 does not overlap r1

\*/

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***3-29 TwoCircles.java:***

package Unit\_3;

import java.util.Scanner;

public class \_29\_TwoCircles {

public static void main(String[] args) {

Scanner sc = new Scanner(System.in);

System.out.print("Enter circle1’s center x-, y-coordinates, and radius:");

float x1 = sc.nextFloat(), y1 = sc.nextFloat(), r1 = sc.nextFloat();

System.out.print("Enter circle2’s center x-, y-coordinates, and radius:");

float x2 = sc.nextFloat(), y2 = sc.nextFloat(), r2 = sc.nextFloat();

float dist = (x2 - x1) \* (x2 - x1) + (y2 - y1) \* (y2 - y1);

System.out.print("circle2 ");

if (dist >= (r1 + r2) \* (r1 + r2)) {

// outside

System.out.print("does not overlap");

} else if (dist <= (r1 - r2) \* (r1 - r2)) {

// inside

System.out.print("is inside");

} else {

// overlaps

System.out.print("overlaps");

}

System.out.print(" circle1");

}

}

/\*

Enter circle1’s center x-, y-coordinates, and radius:

Enter circle2’s center x-, y-coordinates, and radius:

\*/

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**Unit 5:**

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***5-7 CalculateTuition.java:***

package Unit\_5;

public class \_07\_CalculateTuition {

public static void main(String[] args) {

double tuition = 10\_000;

for (int i = 0; i < 10; i++) {

tuition \*= 1.05;

}

System.out.println("Tuition after 10 tears: " + tuition);

double sum = 0;

for (int i = 0; i < 4; i++) {

sum += tuition;

tuition += tuition \* 0.05;

}

System.out.println("Sum of tuition in 4 years: " + sum);

}

}

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***5-17 ShowPyramid.java:***

package Unit\_5;

import java.util.Scanner;

public class \_17\_ShowPyramid {

public static void main(String[] args) {

System.out.print("Enter the number of lines (1-15): ");

Scanner sc = new Scanner(System.in);

int n = sc.nextInt();

for (int i = 1; i <= n; i++) {

for (int j = n; j > i; j--) {

System.out.print(j > 9 ? " " : " ");

}

for (int j = i; j >= 2; j--) {

System.out.print(j + " ");

}

System.out.print("1");

for (int j = 2; j <= i; j++) {

System.out.print(" " + j);

}

System.out.println();

}

}

}

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***5-19 PrintPyramidNumber.java:***

package Unit\_5;

public class \_19\_PrintPyramidNumber {

public static void main(String[] args) {

int level = 0;

for (int i = 1; i <= 128; i <<= 1) {

level++;

//4

for (int j = 0; j < 8 - level; j++) {

System.out.printf(j == 0 ? "%s" : "%4s", " ");

}

for (int j = 1; j < i; j <<= 1) {

System.out.printf(j == 1 && i == 128 ? "%d" : "%4d", j);

}

System.out.printf("%4d", i);

for (int j = i >> 1; j > 0; j >>= 1) {

System.out.printf("%4d", j);

}

System.out.println();

}

}

}

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***5-21 CompareVariousRatesLoans.java:***

package Unit\_5;

import java.util.Scanner;

public class \_21\_CompareVariousRatesLoans {

public static void main(String[] args) {

Scanner input = new Scanner(System.in);

System.out.print("Loan Amount: ");

double loanAmount = input.nextDouble();

// loanAmount = 10000;

System.out.print("Number of Years: ");

int numberOfYears = input.nextInt();

// numberOfYears = 5;

System.out.println("Interest Rate\t\tMonthly Payment\t\tTotal Payment");

for (double annualInterestRate = 5; annualInterestRate <= 8; annualInterestRate += 0.125) {

double monthlyInterestRate = annualInterestRate / 1200;

double monthlyPayment = loanAmount \* monthlyInterestRate /

(1 - 1 / Math.pow(1 + monthlyInterestRate, numberOfYears \* 12));

double totalPayment = monthlyPayment \* numberOfYears \* 12;

System.out.printf("%.3f%%\t\t\t\t%.2f\t\t\t\t%.2f\n", annualInterestRate, monthlyPayment, totalPayment);

}

}

}

/\*

Loan Amount:

Number of Years:

Interest Rate Monthly Payment Total Payment

\*/

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***5-22 LoanAmortizationSchedule.java:***

package Unit\_5;

import java.util.Scanner;

public class \_22\_LoanAmortizationSchedule {

public static void main(String[] args) {

Scanner input = new Scanner(System.in);

System.out.print("Loan Amount: ");

double loanAmount = input.nextDouble();

// loanAmount = 10000;

System.out.print("Number of Years: ");

int numberOfYears = input.nextInt();

// numberOfYears = 1;

System.out.print("Annual Interest Rate: ");

double annualInterestRate = input.nextInt();

// annualInterestRate = 7;

double monthlyInterestRate = annualInterestRate / 1200;

double monthlyPayment = loanAmount \* monthlyInterestRate /

(1 - 1 / Math.pow(1 + monthlyInterestRate, numberOfYears \* 12));

double totalPayment = monthlyPayment \* numberOfYears \* 12;

System.out.println("Monthly Payment: " + monthlyPayment);

System.out.println("Total Payment: " + totalPayment);

double balance = loanAmount;

System.out.println("Payment#\t\tInterest\t\tPrincipal\t\tBalance");

for (int i = 1; i <= 12; i++) {

double interest = balance \* monthlyInterestRate;

double principal = monthlyPayment - interest;

balance -= principal;

System.out.printf("%d\t\t\t\t%.2f\t\t\t%.2f\t\t\t%.2f\n", i, interest, principal, balance);

}

}

}

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***5-25 ComputePI.java:***

package Unit\_5;

public class \_25\_ComputePI {

public static void main(String[] args) {

for (int i = 10000; i <= 100000; i += 10000) {

double pi = 0, sign = 1;

for (int j = 1; j <= i; j++) {

pi += sign / (2 \* j - 1);

sign \*= -1;

}

System.out.println(4 \* pi);

}

}

}

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***5-26 ComputeE.java:***

package Unit\_5;

public class \_26\_ComputeE {

public static void main(String[] args) {

for (int i = 10000; i <= 100000; i += 10000) {

double e = 1, denominator = 1;

for (int j = 1; j <= i; j++) {

denominator \*= j;

e += 1 / (denominator);

}

System.out.println(e);

}

}

}

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***5-27 DisplayLeapYears.java:***

package Unit\_5;

import java.util.Calendar;

public class \_27\_DisplayLeapYears {

public static void main(String[] args) {

int cnt = 0, counter = 0;

for (int i = 101; i <= 2100; i++) {

if (isLeapYear(i)) {

counter++;

if (++cnt < 10){

System.out.print(i + " ");

} else {

System.out.println(i);

cnt = 0;

}

}

}

System.out.println("\n" + counter);

}

public static boolean isLeapYear(int year) {

return year % 4 == 0 && year %100 != 0 || year % 400 == 0;

}

}

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***5-28 DisplayFirstDaysOfMonth.java:***

package Unit\_5;

import java.util.Scanner;

public class \_28\_DisplayFirstDaysOfMonth {

public static void main(String[] args) {

Scanner input = new Scanner(System.in);

int year = input.nextInt(), w = input.nextInt();

int[] months = {31,28,31,30,31,30,31,31,30,31,30,31};

String[] strMonth = {"January", "February", "March", "April", "May", "June", "July", "August", "September", "October", "November", "December"};

String[] week = {"Sunday", "Monday", "Tuesday", "Wednesday", "Thursday", "Friday", "Saturday"};

months[1] += \_27\_DisplayLeapYears.isLeapYear(year) ? 1 : 0;

System.out.println(strMonth[0] + " 1 , " + year + " is " + week[w]);

for (int j = 1; j < months.length; ++j) {

for (int i = 1; i <= months[j]; i++) {

w = (w + 1) % 7;

}

System.out.println(strMonth[j] + " 1 , " + year + " is " + week[w]);

}

}

}

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***5-29 DisplayCalendar.java:***

package Unit\_5;

import java.util.Scanner;

public class \_29\_DisplayCalendar {

public static void main(String[] args) {

Scanner input = new Scanner(System.in);

int year = input.nextInt(), w = input.nextInt();

// year = 2013;w = 2;

int[] months = {31,28,31,30,31,30,31,31,30,31,30,31};

String[] strMonth = {"January", "February", "March", "April", "May", "June", "July", "August", "September", "October", "November", "December"};

// String[] week = {"Sunday", "Monday", "Tuesday", "Wednesday", "Thursday", "Friday", "Saturday"};

months[1] += \_27\_DisplayLeapYears.isLeapYear(year) ? 1 : 0;

for (int j = 0; j < months.length; ++j) {

System.out.println("\t\t\t" + strMonth[j] + " " + year);

System.out.println("————————————————————————————————————");

System.out.println("\tSun\tMon\tTue\tWed\tThu\tFri\tSat");

for (int i = 0; i < w; i++) {

System.out.print("\t");

}

for (int i = 1; i <= months[j]; i++) {

System.out.printf("\t%3d",i);

w = (w + 1) % 7;

if (w == 0) System.out.println();

}

System.out.println();

}

}

}

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***5-32 Lottery.java:***

package Unit\_5;

public class \_32\_Lottery {

public static void main(String[] args) {

int lottery\_1 = (int)(Math.random() \* 100), lottery\_2;

while ((lottery\_2 = (int)(Math.random() \* 100)) == lottery\_1)

;

System.out.println("lottery\_1: " + lottery\_1);

System.out.println("lottery\_2: " + lottery\_2);

}

}

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***5-33 PerfectNumber.java:***

package Unit\_5;

public class \_33\_PerfectNumber {

public static void main(String[] args) {

for (int i = 1; i < 10000; i++) {

int lim = i / 2, sum = 0;

for (int j = 1; j <= lim; j++) {

if (i % j == 0) {

sum += j;

}

}

if (sum == i) {

System.out.println(i);

}

}

}

}

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***5-37 DecimalToBinary.java:***

package Unit\_5;

import java.util.Deque;

import java.util.LinkedList;

import java.util.Scanner;

public class \_37\_DecimalToBinary {

public static void main(String[] args) {

Deque<Integer> s = new LinkedList<>();

Scanner in = new Scanner(System.in);

int n = in.nextInt();

while (n != 0) {

s.push(n % 2);

n /= 2;

}

int res = 0;

while (!s.isEmpty()) {

res = res \* 10 + s.pop();

}

System.out.println(res);

}

}

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***5-38 DecimalToOctal.java:***

package Unit\_5;

import java.util.Deque;

import java.util.LinkedList;

import java.util.Scanner;

public class \_38\_DecimalToOctal {

public static void main(String[] args) {

Deque<Integer> s = new LinkedList<>();

Scanner in = new Scanner(System.in);

int n = in.nextInt();

while (n != 0) {

s.push(n % 8);

n /= 8;

}

int res = 0;

while (!s.isEmpty()) {

res = res \* 10 + s.pop();

}

System.out.println(res);

}

}

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***5-45 ComputeMeanAndStandardDeviation.java:***

package Unit\_5;

import java.util.Scanner;

public class \_45\_ComputeMeanAndStandardDeviation {

/\*

Enter 10 numbers: 1 2 3 4.5 5.6 6 7 8 9 10

The mean is 5.61

The standard deviation is 2.99794

\*/

public static void main(String[] args) {

System.out.print("Enter 10 numbers: ");

Scanner in = new Scanner(System.in);

double[] arr = new double[10];

for (int i = 0; i < 10; i++) {

arr[i] = in.nextDouble();

}

System.out.println("The mean is " + getMean(arr));

System.out.println("The standard deviation is " + getStandardDeviation(arr));

}

private static double getSum(double... nums) {

double sum = 0;

for (double num : nums) {

sum += num;

}

return sum;

}

private static double getMean(double... nums) {

return getSum(nums) / nums.length;

}

private static double getStandardDeviation(double... nums) {

double sum = getSum(nums);

double sum2 = 0;

for (double num : nums) {

sum2 += num \* num;

}

return Math.sqrt((sum2 - sum \* sum / nums.length) / (nums.length - 1));

}

}