**数据结构实验报告7**

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**实验名称**： 第六章程序练习题

**实验要求：**

**实验题目一：1.字符串反转**

1. **输出斐波拉契数列的前n项**
2. **汉诺塔**
3. **七段数码管的改进**

**算法实现：**

1. **方法一**

**def reverse(s):**

**if s == "":**

**return s**

**else:**

**return s[-1] + reverse(s[0:-1])**

**str = input("please enter a string:")**

**print(reverse(str))**

**方法二**

**def reverse(s):**

**n = len(s)**

**if n == 1:**

**return s**

**else:**

**return reverse(s[n//2:]) + reverse(s[0:n//2])**

**str = input("please enter a string:")**

**print(reverse(str))**

**2.def fib(n):**

**if n < 0:**

**print("Error")**

**elif n == 0:**

**return 0**

**elif n == 1:**

**return 1**

**else:**

**return fib(n-1) + fib(n-2)**

**n = int(input("请输入一个整数:"))**

**for i in range(1, n+1):**

**print(fib(i), end=", ")**

**3.def hanoi(a,b,c,p):**

**if len(p) == 1:**

**print("圆盘{}:{}-->{}".format((p[0]), a, c))**

**else:**

**hanoi(a,c,b,p[0:-1])**

**hanoi(a,b,c,[p[-1]])**

**hanoi(b,c,a,p[0:-1])**

**p = range(1,5)**

**hanoi('a','b','c',p)**

**4.import turtle, datetime,random**

**def drawGap(): #绘制数码管间隔**

**turtle.penup()**

**turtle.fd(5)**

**def drawLine(draw): #绘制单段数码管**

**turtle.colormode(255)**

**r = random.randint(0, 255)**

**g = random.randint(0, 255)**

**b = random.randint(0, 255)**

**turtle.pencolor((r, g, b))**

**drawGap()**

**turtle.pendown() if draw else turtle.penup()**

**turtle.fd(40)**

**drawGap()**

**turtle.right(90)**

**def drawDigit(digit): #根据数字绘制七段数码管**

**turtle.pencolor**

**drawLine(True) if digit in [2,3,4,5,6,8,9] else drawLine(False)**

**drawLine(True) if digit in [0,1,3,4,5,6,7,8,9] else drawLine(False)**

**drawLine(True) if digit in [0,2,3,5,6,8,9] else drawLine(False)**

**drawLine(True) if digit in [0,2,6,8] else drawLine(False)**

**turtle.left(90)**

**drawLine(True) if digit in [0,4,5,6,8,9] else drawLine(False)**

**drawLine(True) if digit in [0,2,3,5,6,7,8,9] else drawLine(False)**

**drawLine(True) if digit in [0,1,2,3,4,7,8,9] else drawLine(False)**

**turtle.left(180)**

**turtle.penup()**

**turtle.fd(20)**

**def drawDate(date):**

**turtle.colormode(255)**

**r = random.randint(0, 255)**

**g = random.randint(0, 255)**

**b = random.randint(0, 255)**

**turtle.pencolor((r, g, b))**

**for i in date:**

**if i == '-':**

**turtle.write('年',font=("Arial", 18, "normal"))**

**turtle.fd(40)**

**elif i == '=':**

**turtle.write('月',font=("Arial", 18, "normal"))**

**turtle.fd(40)**

**elif i == '+':**

**turtle.write('日',font=("Arial", 18, "normal"))**

**else:**

**drawDigit(eval(i))**

**def main():**

**turtle.setup(800, 350, 200, 200)**

**turtle.penup()**

**turtle.fd(-300)**

**turtle.pensize(5)**

**drawDate(datetime.datetime.now().strftime('%Y-%m=%d+'))**

**turtle.hideturtle()**

**turtle.done()**

**main()**

**实验结果：**

