计算机程序设计实验报告 实验六

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一、实验题目

**1.题目1 133页2题**

源代码：

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| **#include <stdio.h>**  **int factorsNum = 0;**  **int isPerfectNumber(int num, int factorList[]);**  **void print(int perfectNumber, int factorList[]);**  **int main() {**  **int i, upperNumber, factorList[100];**  **printf("请输入范围上限：");**  **scanf("%d", &upperNumber);**  **for (i = 1; i <= upperNumber; i++) {**  **if (isPerfectNumber(i, factorList) == 1) {**  **print(i, factorList);**  **factorsNum = 0;**  **}**  **}**  **return 0;**  **}**  **int isPerfectNumber(int num, int factorList[]) {**  **int i, j = 0, sum = 0;**  **for (i = 1; i < num; i++) {**  **if (num % i == 0) {**  **factorList[j] = i;**  **j++;**  **factorsNum++;**  **}**  **}**  **for (i = 0; i < j; i++)**  **sum += factorList[i];**  **if (num == sum)**  **return 1;**  **return 0;**  **}**  **void print(int perfectNumber, int factorList[]) {**  **int i;**  **printf("%d:", perfectNumber);**  **for (i = 0; i < factorsNum; i++) {**  **printf("%d ", factorList[i]);**  **}**  **printf("\n");**  **}** |

执行结果：

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| **请输入范围上限：100**  **6：1 2 3**  **28：1 2 4 7 14** |

1. **题目2，136页3题**

源代码：

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| **#include <stdio.h>**  **extern int extern\_num;**  **static int static\_num = 100;**  **int n = 10;**  **void func0() {**  **printf("extern\_num:%d\n", extern\_num);**  **printf("static\_num:%d\n", static\_num);**  **extern\_num = 2018;**  **static\_num++;**  **printf("extern\_num:%d\n", extern\_num);**  **printf("static\_num:%d\n", static\_num);**  **}**  **void func1() {**  **int n = 20; //n为函数内部定义的局部变量**  **printf("func1 n:%d\n", n);**  **}**  **void func2(int n) { //n作为形参**  **printf("func2 n:%d\n", n);**  **}**  **void func3() {**  **printf("func3 n:%d\n", n);**  **}**  **void func4();**  **void func5(int);**  **int main() {**  **func0();**  **printf("extern\_num:%d\n", extern\_num);**  **printf("static\_num:%d\n", static\_num);**  **int n = 30;**  **func1();**  **func2(n);**  **func3;**    **{**  **int n = 40;**  **printf("block n:%d\n", n);**  **}**  **printf("main n:%d\n", n);**  **func4();**  **func5(n);//n=30**  **return 0;**  **}**  **int extern\_num = 90;**  **int n1 = 50;**  **void func4() {**  **printf("global variable n1:%d\n", n1);**  **printf("global variable n:%d\n", n);**  **}**  **void func5(int n) {**  **static int n5 = 10;**  **n5++;**  **printf("n5+n=%d\n", n5 + n);**  **static\_num++;**  **printf("extern\_num:%d\n", extern\_num);**  **printf("static\_num:%d\n", static\_num);**  **}** |

执行结果：

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| extern\_num:90  static\_num:100  extern\_num:2018  static\_num:101  extern\_num:2018  static\_num:101  func1 n:20  func2 n:30  block n:40  main n:30  global variable n1:50  global variable n:10  n5+n=41  extern\_num:2018  static\_num:102 |

1. **题目3，138页4题**

源代码：

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| **//p138 3.3.2.4-用递归函数实现任意整数的反转输出**  **#include <stdio.h>**  **#include <math.h>**  **void decimalReverse(unsigned decimal) {**  **if (decimal / 10 == 0) {**  **printf("%d", decimal);**  **} else {**  **printf("%d", decimal % 10);**  **decimalReverse(decimal / 10);**  **}**  **}**  **int main() {**  **int decimal;**  **printf("Plwase enter a decimal:");**  **scanf("%d", &decimal);**  **printf("%d<->%c", decimal, decimal > 0 ? ' ' : '-');**  **decimalReverse(fabs(decimal));**  **return 0;**  **}** |

执行结果：

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| Plwase enter a decimal:12345  12345<->54321 |

**4.题目4，140页4题**

源代码：

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| **//p140 3.3.3.4-递归法进制转换**  **#include <stdio.h>**  **#include <math.h>**  **void dec2sn(int decimal, int systemNumber);**  **int main() {**  **int decimal, systemNumber;**  **scanf("%d%d", &decimal, &systemNumber);**  **dec2sn(decimal, systemNumber);**  **return 0;**  **}**  **void dec2sn(int decimal, int systemNumber) {**  **int rest;//商**  **switch (systemNumber) {**  **case 2:**  **case 8:**  **if (decimal < systemNumber)**  **printf("%d", decimal);**  **else {**  **rest = decimal / systemNumber; dec2sn(rest, systemNumber);**  **printf("%d", decimal % systemNumber); }**  **break;**  **case 16:**  **if (decimal < systemNumber)**  **switch (decimal) {**  **case 0:**  **case 1:**  **case 2:**  **case 3:**  **case 4:**  **case 5:**  **case 6:**  **case 7:**  **case 8:**  **case 9:**  **printf("%d", decimal);**  **break;**  **case 10:**  **printf("A");**  **break;**  **case 11:**  **printf("B");**  **break;**  **case 12:**  **printf("C");**  **break;**  **case 13:**  **printf("D");**  **break;**  **case 14:**  **printf("E");**  **break;**  **case 15:**  **printf("F");**  **break;**  **} else {**  **rest = decimal / systemNumber;**  **dec2sn(rest, systemNumber);**  **switch (decimal % systemNumber) {**  **case 0:**  **case 1:**  **case 2:**  **case 3:**  **case 4:**  **case 5:**  **case 6:**  **case 7:**  **case 8:**  **case 9:**  **printf("%d", decimal);**  **break;**  **case 10:**  **printf("A");**  **break;**  **case 11:**  **printf("B");**  **break;**  **case 12:**  **printf("C");**  **break;**  **case 13:**  **printf("D");**  **break;**  **case 14:**  **printf("E");**  **break;**  **case 15:**  **printf("F");**  **break;**  **}**  **}**  **break;**  **default:**  **printf("ERROR!");**  **break;**  **}**  **}** |

执行结果：

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| 111 8  157 |

**5.题目5 142页7题**

源代码：

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| **//p142 3.3.3.7-标识符判别**  **#include <stdio.h>**  **#include <ctype.h>**  **#include <string.h>**  **int check(char a[]);**  **int main() {**  **char a[100];**  **printf("请输入16字节以下字符串：\n");**  **scanf("%s", a);**  **if (check(a) == 1)**  **printf("生成长度为%d的标识符%s", strlen(a), a);**  **else if (check(a) == 2)**  **printf("字符串过长！");**  **else if (check(a) == 3)**  **printf("您输入的第一个字符不是字母或下划线！");**  **else if (check(a) == 0)**  **printf("输入不合法！");**  **return 0;**  **}**  **int check(char a[]) {**  **int flag = 0, i;//循环变量，开关变量**  **if (strlen(a) > 16)**  **return 2;//先检查字符串长度，用<string.h>的strlen函数**  **else {**  **if (a[0] >= 'a' && a[0] <= 'z' || a[0] >= 'A' && a[0] <= 'Z' || a[0] == 95) {**  **for (i = 1; i < strlen(a); i++) {**  **if (isalnum(a[i]) != 0)**  **flag++;**  **}**  **if (flag == 0)**  **return 1;**  **else**  **return 0;**  **} else**  **return 3;**  **}**  **}** |

执行结果：

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| 请输入16字节以下字符串：  d  生成长度为1的标识符d  请输入16字节以下字符串：  **1246**  **您输入的第一个字符不是字母或下划线！**  **请输入16字节以下字符串：**  **65453123213534312351223465312**  **字符串过长！**  **请输入16字节以下字符串：**  **b123%^&%**  **输入不合法！** |

**6.题目6，145页1题**

源代码：

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| **//p145 3.4.3.1-字符串长度排序**  **#include <stdio.h>**  **#define StrLen 100;**  **void udf\_getString(char[], int strlength);**  **int udf\_strlen(char s[]);**  **void udf\_sort(char s[][StrLen], int strNum);**  **void udf\_print(char s[][StrLen], int strNum);**  **int main() {**  **char s[100][StrLen];**  **int strNum = 0;**  **int i = 0;**  **do {**  **printf("请输入字符串%d(输入Ctrl+Z+Enter+Enter结束输入)：\n", i + 1);**  **udf\_getString(s[i], StrLen);**  **i++;**  **} while (udf\_strlen(s[i - 1]) != 0);**  **strNum = i - 1;i**  **udf\_sort(s, strNum);**  **udf\_print(s, strNum);**  **return 0;**  **}**  **void udf\_getString(char a[], int strlength) {**  **int i;**  **loop:**  **scanf("%s", a);**  **getchar();**  **if (udf\_strlen(a) >= strlength) {**  **printf("超长！请重新输入:\n");**  **for (i = 0; i < strlength; i++) {**  **a[i] = '\0';**  **}**  **goto loop;**  **}**  **return;**  **}**  **int udf\_strlen(char s[]) {**  **int i;**  **for (i = 0; s[i] != '\0'; i++);**  **return i;**  **}**  **void udf\_sort(char s[][StrLen], int strNum) {**  **char a[StrLen];**  **int i, j, k;**  **for (i = 0; i < strNum; i++) {**  **for (j = i; j > 0; j--) {**  **if (udf\_strlen(s[j]) < udf\_strlen(s[j - 1])) {**  **for (k = 0; k < StrLen; k++) {**  **a[k] = s[j][k];**  **s[j][k] = s[j - 1][k];**  **s[j - 1][k] = a[k];**  **}**  **}**  **}**  **}**  **return;**  **}**  **void udf\_print(char s[][StrLen], int strNum) {**  **int i;**  **printf("排序结果：\n");**  **for (i = 0; i < strNum; i++) {**  **printf("%s\n", s[i]);**  **}//输出**  **return;**  **}** |

执行结果：

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| 请输入字符串1(输入Ctrl+Z+Enter+Enter结束输入)：  chgngvcgthnygc^Z  请输入字符串2(输入Ctrl+Z+Enter+Enter结束输入)：  tuyjugtyj^Z  请输入字符串3(输入Ctrl+Z+Enter+Enter结束输入)：  cf^Z  请输入字符串4(输入Ctrl+Z+Enter+Enter结束输入)：  ^Z  排序结果：  cf  tuyjugtyj  chgngvcgthnygc |

**7.题目7，146页3题**

源代码：

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| **//p146 3.4.3.3-数组合并排序**  **#include <stdio.h>**  **#define M 5**  **#define N 5**  **int main() {**  **int a[M + N], b[N];**  **int i, j;**  **int min;**  **printf("请输入数组1:\n");**  **for (i = 0; i < M; i++)**  **scanf("%d", &a[i]);**  **printf("请输入数组2:\n");**  **for (i = 0; i < N; i++)**  **scanf("%d", &b[i]);**  **for (i = M; i < M + N; i++) {**  **a[i] = b[i - M];**  **}**  **for (i = 0; i < M + N - 1; i++) {**  **min = i;**  **for (j = i + 1; j < M + N; j++) {**  **min = a[min] > a[j] ? j : min;**  **}**  **int temp = a[i];**  **a[i] = a[min];**  **a[min] = temp;**  **}**  **printf("合并后的排序结果为：\n");**  **for (i = 0; i < M + N; i++)**  **printf("%d ", a[i]);**  **return 0;**  **}** |

执行结果：

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| 请输入数组1:  123 12 111 323 1233 4  请输入数组2:  1 2 3 45  合并后的排序结果为：  1 2 3 4 12 45 111 123 323 1233 |

**8.题目8，75页17题**

源代码：

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| **//p148 3.4.3.6-二分法查找数据**  **#include <stdio.h>**  **#define N 10**  **int findByHalf(int a[], int n, int x) {**  **int low = 0;**  **int high = n - 1;**  **int middle;**  **while (low <= high) {**  **middle = (low + high) / 2;**  **if (x == a[middle])**  **return middle;**  **else if (x > a[middle])**  **low = middle + 1;**  **else if (x < a[middle])**  **high = middle - 1;**  **}**  **return -1;//若出循环，说明没找到**  **}**  **int main() {**  **int a[N];**  **int i;**  **int x, flag;**  **for (i = 0; i < N; i++) {**  **a[i] = 2 \* i + 1;**  **}**  **printf("请输入正整数：\n");**  **scanf("%d", &x);**  **flag = findByHalf(a, N, x);**  **if (flag == -1) {**  **printf("删除后的结果为：\n未找到待删除数字！");**  **} else {**  **for (i = flag; i < N; i++) {**  **a[i] = a[i + 1];**  **}**  **printf("删除结果为：\n");**  **for (i = 0; i < N - 1; i++)**  **printf("%d ", a[i]);**  **}**  **return 0;**  **}** |

执行结果：

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| 请输入正整数：  13  删除结果为：  1 3 5 7 9 11 15 17 19 |