C语言作业

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1 实验1 C程序的运行环境和运行C程序的方法

2.(4)

```
#include <stdio.h>
void main(){
     printf("This is a c program.\n");
}
```

运行结果

```
This is a c program.
```

2.(5)

```
#include <stdio.h>
void main(){
    int a, b, sum;
    a = 123; b = 456;
    sum = a + b;
    printf("sum is %d\n", sum);
}
```

运行结果

```
579
```

2.(6)

```
#include <stdio.h>
void main(){
   int max(int x, int y);
   int a, b, c;
   printf("input a & b:");
   scanf("%d,%d", &a, &b);
   c = max(a, b);
   printf("max=%d\n", c);
}

int max(int x, int y){
   int z;
   if (x > y) z = x;
   else z = y;
   return z;
}
```

运行结果

```
max=5
```

2.(7)

```
#include <stdio.h>
int main(){
   int a, b, c;
   scanf("%d%d%d", &a, &b, &c);
   printf("%d\n", a>b&&a>c?a:(b>c?b:c));
   return 0;
}
```

2 实验2 数据类型、运算符和表达式

2.(1)

```
#include <stdio.h>
void main(){
    char c1, c2;
    c1 = 'a';
    c2 = 'b';
    printf("%c %c\", c1, c2);
}
```

运行结果

```
a b
```

2.(2)

```
#include <stdio.h>
void main(){
   char c1='a', c2='b', c3='c', c4='\101', c5='\116';
   printf("a%c b%c\tc%c\tabc\n", c1, c2, c3);
   printf("\t\b%c %c\n", c4, c5);
}
```

运行结果

```
aa bb cc abc
       A N
```

2.(3)

```
#include <stdio.h>
void main(){
   int a, b;
   unsigned c, d;
   long e, f;
   a = 100;
   b = -100;
```

```
    e = 50000;
    f = 32767;
    c = a;
    d = b;
    printf("%d,%d\n", a, b);
    printf("%u,%u\n", a, b);
    printf("%u,%u\n", c, d);
    c = a = c;
    d = b = f;
    printf("%d,%d\n", a, b);
    printf("%u,%u\n", c, d);
}
```

运行结果

```
100,-100
100,4294967196
100,4294967196
100,32767
100,32767
```

2.(4)

```
#include <stdio.h>
void main(){
    int i, j, m, n;
    i = 8;
    j = 10;
    m = ++i;
    n = j++;
    printf("%d,%d,%d,%d\n", i, j, m, n);
}
```

运行结果

```
9,11,9,10
```

2.(5)

```
#include <string.h>
#include <stdio.h>
int main(){
    char s[100];
    int n, i;
    scanf("%s", s);
    n = strlen(s);
    for (i = 0; i < n; i++){
         s[i] += 4;
         if (s[i] > 'z' || s[i] > 'Z' && s[i] < 'a') s[i] -= 26;
    }
    printf("%s\n", s);
    return 0;
}
```

3 实验3 最简单的C程序设计

2.(1)

```
#include <stdio.h>
void main(){
    int a, b;
    float d, e;
    char c1, c2;
    double f, g;
    long m, n;
    unsigned int p, q;
    a = 61; b = 62;
    c1 = 'a'; c2 = 'b';
    d = 3.56; e = -6.87;
    f = 3157.890121; g = 0.123456789;
    m = 50000; n = -60000;
    p = 32768; q = 40000;
    printf("a=%d,b=%d\nc1=%c,c2=%c\nd=%6.2f,e=%6.2f\n",a,b,c1,c2,d,e);
    printf("f=%15.6f,g=%15.12f\nm=%ld,n=%ld\np=%u,%q=%u\n",f,g,m,n,p,q);
}
```

运行结果

```
a=61,b=62
c1=a,c2=b
d=  3.56,e= -6.87
f=    3157.890121,g= 0.123456789000
m=50000,n=-60000
p=32768,q=40000
```

2.(2)

```
#include <stdio.h>
int main(){
        double r, h;
        const double pi = 3.141593;
        scanf("%lf%lf", &r, &h);
        printf("circle perimeter: %.2f\n", 2 * pi * r);
        printf("circle aera: %.2f\n", pi * r * r);
        printf("sphere aera: %.2f\n", 4 * pi * r * r);
        printf("sphere volume: %.2f\n", 4.0 / 3 * pi * r * r * r);
        printf("cylinder volume: %.2f\n", pi * r * r * h);
        return 0;
}
```

运行结果

```
circle perimeter: 9.42
circle aera: 7.07
sphere aera: 28.27
sphere volume: 14.14
cylinder volume: 21.21
```

2.(3)

```
#include <stdio.h>
int main(){
     char c1, c2;
     c1 = getchar(), c2 = getchar();
     putchar(c1);
     printf("%c\n", c2);
     return 0;
}
```

运行结果

```
21
21
```

4 实验4 逻辑结构程序设计

2.(1)

```
#include <stdio.h>
int main(){
    int x, y;
    scanf("%d", &x);
    if (x < 1) y = x;
    else if (x < 10) y = 2 * x - 1;
         else y = 3 * x - 11;
    printf("%d\n", y);
    return 0;
}
```

2.(2)

```
#include <stdio.h>
int main(){
    int x, y;
    scanf("%d", &x);
    if (x >= 90) y = 'A';
    else if (x >= 80) y = 'B';
         else if (x >= 70) y = 'C';
      else if (x >= 60) y = 'D';
           else y = 'E';
    printf("%c\n", y);
    return 0;
}
-------------------------------------------------
#include <stdio.h>
int main(){
    int x, y;
    scanf("%d", &x);
    switch (x/10) {
```

```
    case 10:
    case 9: y = 'A'; break;
    case 8: y = 'B'; break;
    case 7: y = 'C'; break;
    case 6: y = 'D'; break;
    defaut: y = 'E'; break;
    }
    printf("%c\n", y);
    return 0;
}
```

2.(3)

```
#include <string.h>
#inlcude <stdio.h>

int main(){
    char s[100];
    int n, i;
    scanf("%s", s);
    n = strlen(s);
    printf("%d\n", n);
    for (i = 0; i < n; i++)
         printf("%d\n", s[i]);
    for (i = 0; i < n; i++)
         putchar(s[n - i - 1]);
    puts("");
    reutrn 0;
}
```

2.(4)

```
#include <stdio.h>
int main(){
    int a[4], i, j;
    for (i = 0; i < 4; i++)
         scanf("%d", a + i);
    for (i = 0; i < 3; i++)
      for (j = 0; j < 3 - i; j++)
          if (a[j] < a[j + 1])
               a[j] ^= a[j + 1] ^= a[j] ^= a[j + 1];
    for (i = 0; i < 4; i++)
        printf("%d\n", a[i]);
    return 0;
}
```

5 实验5 循环控制

2.(1)

```
#include <stdio.h>
int gcd(int a, int b){
    if (a < 0) return gcd(-a, b);
    if (b < 0) return gcd(a, -b);
    return b ? gcd(b, a % b) : a;
}
int main(){
    int a, b;
    scanf("%d%d", &a, &b);
    printf("%d\n", gcd(a, b);
    return 0;
}
```

2.(2)

```
#include <stdio.h>
#include <ctype.h>
int main(){
    char s[1000];
    int n, i, num, letter, space, other;
    num = letter = space = other = 0;
    scanf("%s", s);
    for (i = 0; i < n; i++) {
          num += isdigit(s[i]);
          letter += isalpha(s[i]);
          space += (s[i] == ' ');
          other += !(isalnum(s[i]) + s[i] == ' ');
    }
    printf("num: %d\nletter: %d\nspace :%d\nother :%d\n", num,
         letter, space, other);
    return 0;
}
```

2.(3)

```
#include <stdio.h>
double f(double x){
    return 6 * x * x - 8 * x + 3;
}
int main(){
    double ans = 1.5;
    int i = 0;
    for (i = 0; i < 100; i++)
       ans = f(ans);
    printf("%f\n", ans);
    return 0;
}
```

2.(4)

```
#include <stdio.h>
int main(){
    int ans = 1, i;
    for (i = 9; i >= 1; i--)
       ans = (ans + 1) * 2;
    printf("%d\n", ans);
    return 0;
}
```

6 实验6 数组

2.(1)

```
#include <stdio.h>
int a[100];
int main(){
    int i, t, j;
    for (i = 0; i < 10; i++)
        scanf("%d", a + i);
    for (i = 0; i < 10; i++) {
        t = i;
        for (j = i + 1; j < 10; j++)
            if (a[j] < a[t]) t = j;
        a[i] ^= a[t] ^= a[i] ^= a[t];
    }
    for (i = 0; i < 10; i++)
       printf("%d\n", a[i]);
    return 0;
}
```

2.(2)

```
#include <stdio.h>
int a[100];
int main(){
    int i, j, t, k, mid;
    for (i = 0; i < 15; i++)
         scanf("%d", a + i);
    for (i = 0; i < 15; i++){
        t = i;
for (j = i + 1; j < 15; j++)
    if (a[j] < a[t] ) t = j;
        a[i] ^= a[t] ^= a[i] ^= a[t];
    }
    scanf("%d", &k);

    i = 0; j = 15;
    while (i < j){
       mid = i + j >> 1;
       if (a[mid] <= k) i = mid + 1;
```

```
        else if (a[mid] > k) j = mid;
    }
    if (i > j || i == 0) printf("无此数\n");
    eles printf("%d\n", i - 1);

    return 0;
}
```

2.(3)

```
#include<stdio.h>
int main(){
    char s1[100], s2[100], *p;
    int n1, n2, i, j;

    scanf("%s%s", s1, s2);
    n1 = strlen(s1);
    for (p = s1 + n1; *s2; p++, s2++)
         *p = *s2;
    *p = 0;
    printf("%s\n", s1);
    return 0;
}
```

2.(4)

```
#include <stdio.h>

int a[10][10];
int n, m, t;

bool isgood(int x, int y){
    int i, j;

    for (i = 0; i < n; i++)
        if (a[i][y] < a[x][y]) return 0;
    for (i = 0; i < m; i++)
        if (a[x][i] > a[x][y]) return 0;
    return 1;
}

int main(){
    int i, j;

    scanf("%d%d", &n, &m);
    for (i = 0; i < n; i++)
        for (j = 0; j < m; j++)
            scanf("%d", &a[i][j]);
    for (i = 0; i < n; i++)
        for (j = 0; j < m; j++)
             if (isgood(i, j)) printf("%d %d %d\n", i, j, a[i][j]);
```

```
   return 0;
}
```

7 实验7 函数

2.(1)

```
#include <stdio.h>

bool isprime(x){
   int i;
   if (x < 2) return 0;
   for (i = 2; i * i <= x; i++)
       if (x % i == 0) return 0;
   return 1;
}

int main(){
    int x;
    scanf("%d", &x);
    if (isprime(x)) printf("YES\n");
    else printf("NO\n");
    return 0;
}
```

2.(3)

```
#include <stdio.h>
int main(){
    int x, i, j;
    char s[100];

    scanf("%d", x);
    for (i = 0; x; i++, x /= 10)
       a[i] = x % 10 + '0';

    for (j = 0; j < i / 2; j++)
        a[j] ^= a[i - 1 - j] ^= a[j] ^= a[i - 1 - j];

    printf("%s\n", a[i]);
    return 0;
}
```

2.(4)

```
int gcd(int a, int b){
    if (a < 0) reutrn gcd(-a, b);
    if (b < 0) return gcd(b, -a);
    return b ? gcd(b, a % b) : a;
}
```

```
int lcm(int a, int b){
    return a / gcd(a ,b) * b;
}
```

8 实验8 编译预处理

2.(1)

```
#define swap(a, b) ((a)^=(b)^=(a)^=(b))
```

2.(2)

```
#define output1(x) printf("%6.2f\n", x)
#define output2(x, y) printf("%6.2f %6.2f\n", x, y)
#define output3(x, y, z) printf("%6.2f %6.2f %6.2f\n", x, y, z)
```

2.(3)

```
#include <stdio.h>
#include <string.h>

#define CHANGE 1
int main(){
    char s[100];
    int n, i;

    scanf("%s", s);
    n = strlen(s);
    #ifdef CHANGE 1
        for (i = 0; i < n; i++){
            s[i]++;
            if (s[i] > 'z') s[i] = 'a';
        }
    #endif

    printf("%s\n", s);
    return 0;
}
```

9 实验9 指针

2.(1)

```
#include <string.h>
#include <stdio.h>

int main(){
    char s[3][100], p[3];
    int i, j;

    for (i = 0; i < 3; i++)
```

```
       scanf("%s", s[i]);
    for (i = 0; i < 3; i++)
       p[i] = s[i];
    for (i = 0; i < 3; i++)
       for (j = 0; j < 2 - i; j++)
           if (strcmp(p[j], p[j + 1] > 0)
       p[j] ^= p[j+1] ^= p[j] ^= p[j + 1];
    for (i = 0; i < 3; i++)
        printf("%s\n", p[i]);
    retrun 0;
}
```

2.(2)

```
#include <stdio.h>
int main(){
    int a[3][3], b[3][3];
    int i, j;

    for (i = 0; i < 3; i++)
        for (j = 0; j < 3; j++){
            scanf("%d", &a[i][j]);
            b[j][i] = a[i][j];
        }

    for (i = 0; i < 3; i++) {
        for (j = 0; j < 3; j++)
             printf("%d ", a[i][j]);
        puts("");
    }

    return 0;
}
```

2.(3)

```
#include <stdio.h>
#include <math.h>

int main(){
     int n, D = 1;
     scanf("%d", &n);

     while (D <= 2 * n)
       D = int(floor(1.5*D));

     printf("%d\n", 3 * n + 1 - D);

     return 0;
}
```

2.(4)

```
int strcmp(char *s, char *t){
   int ns = strlen(s), nt = strlen(t);
   if (ns > nt) return 1;
   if (ns < nt) return -1;
   for (;*s == *t && *s; s++, t++) ;
   if (*s > *t) return 1;
   if (*s < *t) return -1;
   return 0;
}
```

2.(5)

```
void sort(int *a, int n){
     int i, j;
     for (i = 0; i < n; i++)
         for (j = 0; j < n - i - 1; j++)
             if (a[j] > a[j + 1]) a[j] ^= a[j + 1] ^= a[j] ^= a[j + 1];
}
```