武汉大学数学与统计学院2017-2018学年第一学期期末考试
数据结构与算法（A卷答案）

1. （10分）

```c
#include<stdio.h>
#define N 456
#define X 124.35
#define S "Hello World"
int main(void)
{
  printf("*%8d*\n", N);
  printf("*%-8d*\n", N);
  printf("*%.2f*\n", X);
  printf("*%10.3f*\n", X);
  printf("*%-10.3e*\n", X);
  printf("*%+10.2f*\n", X);
  printf("*%010.2f*\n", X);
  printf("*%15s*\n", S);
  printf("*%15.5s*\n", S);
  printf("*%-15.5s*\n", S);

  return 0;
}
```

2. （15分）

```c
#include<stdio.h>
#include<ctype.h>
int main(void)
{
  char ch;
  int na, nb, nc, nd;
  na = nb = nc = nd = 0;
  while((ch = getchar()) != EOF) {
    switch(toupper(ch)) {
    case 'A': na++; break;
    case 'B': nb++; break;
    case 'C': nc++; break;
    case 'D': nd++; break;
    default: break;
    }
  }
  printf("na = %3d, nb = %3d, nc = %3d, nd = %3d\n", na, nb, nc, nd)
  ;
  return 0;
}
```

3. （15分）

```c
#include<stdio.h>
void print(int n);

int main(void)
```

```c
{
  int n;

  printf("Plese enter an integer: ");
  scanf("%d", &n);
  print(n);

  return 0;
}

void print(int n)
{
  if(n > 0) {
    print(n-1);
    printf("%d\n", n);
  }
}
```

4. （60分）

```c
#include<stdio.h>
#include<stdbool.h>

void swap(int * a, int * b)
{
  int temp;

  temp = *a;
  *a = *b;
  *b = temp;
}

void order_array(int * ar, int n)
{
  int i, j;

  for(i = 0; i < n-1; ++i) {
    for(j = i+1; j < n; ++j) {
      if(ar[i] > ar[j])
    swap(&ar[i], &ar[j]);
    }
  }
}

bool search_array(const int * ar, int n, int x)
{
  int i;
  bool flag = false;

  for(i = 0; i < n; ++i){
    if(ar[i] == x) {
      flag = true;
      break;
    }
  }
```

```c
  return flag;
}


int delete_array(int * ar, int n, int i)
{
  int j;
  int val = ar[i];

  for(j = i+1; j < n; ++j)
    ar[j-1] = ar[j];

  return val;
}


void show_array(const int * ar, int n, char type)
{
  int i;

  if(type == 'r') {
    for(i = 0; i < n; ++i)
      printf("%3d ", ar[i]);
    printf("\n");
  }else {
    for(i = 0; i < n; ++i)
      printf("%3d\n", ar[i]);
  }
}

int main(void)
{
  int ar[] = {3, 1, 5, 7, 2};
  int x = 4;
  show_array(ar, 5, 'r');
  order_array(ar, 5);
  show_array(ar, 5, 'r');

  if(search_array(ar, 5, x))
    printf("%3d is located in ar.\n", x);
  else
    printf("%3d is NOT located in ar.\n", x);

  delete_array(ar, 5, 2);
  show_array(ar, 4, 'r');
}
```