

论题 1-4 作业

姓名：陈劭源

学号：161240004

1 [DH] Problem 2.1

循环体包含两项操作：将当前指针指向的职员工资加入到总工资中；将当前指针指向下一个职员。在处理最后一个职员时，因为该职员已是最后一个，所以“将当前指针指向下一个职员”的操作是未定义的，所以应当单独处理。

2 [DH] Problem 2.2

(a) 冒泡排序完成第 k 次循环时，可以保证第 k 大元素处在正确的位置上。进行 $N-1$ 次循环后，前 $N-1$ 大数已经处在了正确的位置上，第 N 大数则只可能处在最后一个位置上，这恰好也是正确的位置。因此冒泡排序只要进行 $N-1$ 次外层循环即可。

(b) (1) $I \leftarrow 0$;

(2) do the following N times:

(2.1) point to the first element;

(2.2) do the following $N-I$ times:

(2.2.1) compare the element pointed to with the next element;

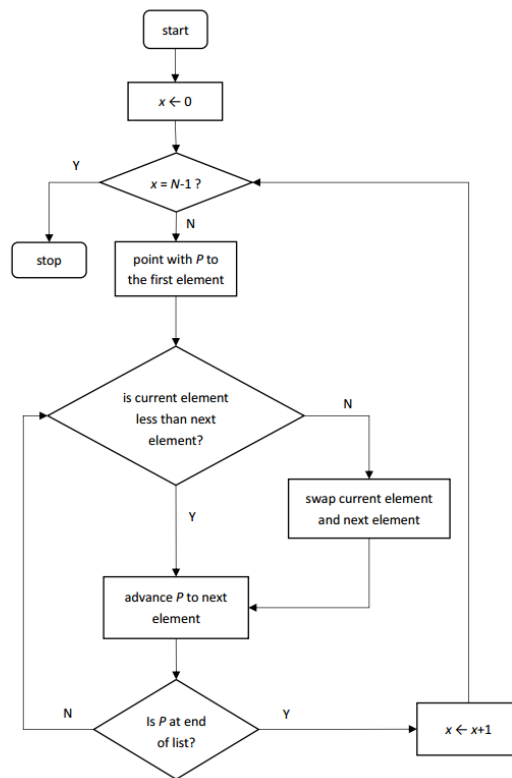
(2.2.2) if the compared elements are in the wrong order, exchange them;

(2.2.3) point to the next element;

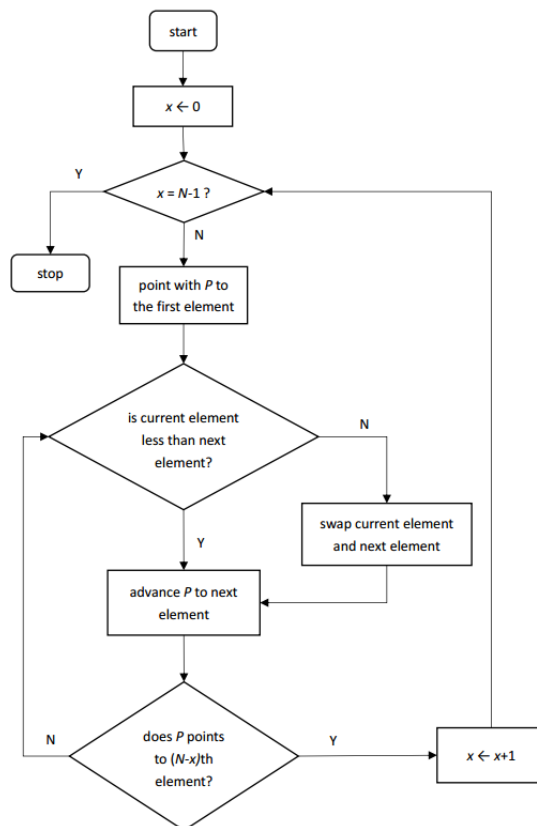
(2.3) $I \leftarrow I + 1$.

3 [DH] Problem 2.3

(流程图见下页)



(a) unimproved



(b) improved

Figure 4: flowchart for bubblesort

4 [DH] Problem 2.4

- (a) (1) $S \leftarrow 0$;
(2) $P \leftarrow 1$;
(3) point to the first element of L
(4) do the following $N - 1$ times:
 (4.1) add the integer pointed to to S ;
 (4.2) if the number pointed to is odd, then
 (4.2.1) multiply P by the number pointed to;
 (4.3) point to the next element of L ;
(5) add the integer pointed to to S ;
(6) if the number pointed to is odd, then
 (6.1) multiply P by the number pointed to.
- (b) (1) $S \leftarrow 0$;
(2) $P \leftarrow 1$;
(3) point to the first element of L
(4) add the integer pointed to to S ;
(5) if the number pointed to is odd, then
 (5.1) multiply P by the number pointed to;
(6) if last element is pointed to, goto (9);
(7) point to the next element of L ;
(8) goto (4);
(9) end.

5 [DH] Problem 2.5

- (a) (1) $I \leftarrow 0$;
(2) while $I < N$ do the following;
 (2.1);
 (2.2) $I \leftarrow I + 1$.
- (b) (1) $t \leftarrow \text{false}$;
(2) while A is true and t is false do the following;
 (2.1);
 (2.2) $t \leftarrow \text{true}$;
(3) while A is false and t is false do the following;
 (3.1);
 (3.2) $t \leftarrow \text{true}$.
- (c) (1) if A is true then do the following:

(1.1);
(1.2) goto (1).

- (d) (1) if A is true then do the following:
 (1.1) repeat the following:
 (1.1.1);
 (1.1) until A is false.

6 [DH] Problem 2.6

move A to C ;
move A to B ;
move C to B ;
move A to C ;
move B to A ;
move B to C ;
move A to C ;
move A to B ;
move C to B ;
move C to A ;
move B to A ;
move C to B ;
move A to C ;
move B to A ;
move C to B ;
move A to C ;
move B to A ;
move B to C ;
move A to C ;
move B to A ;
move C to B ;
move C to A ;
move B to A ;
move B to C ;
move A to C ;
move A to B ;
move C to B ;

move A to C ;
move B to A ;
move B to C ;
move A to C .

7 [DH] Problem 2.7

- (a) (1) $I \leftarrow 1$;
(2) $P \leftarrow 1$;
(3) while $I \leq N$ do the following:
 (3.1) $P \leftarrow P \times I$;
 (3.2) $I \leftarrow I + 1$;
(4) output P .
- (b) function **factorial of** i ;
 (1) if $i = 0$ then return 1;
 (2) return $i \times$ **factorial of** $i - 1$.
- (1) output **factorial of** N .

8 [DH] Problem 2.8

subroutine **while-do**;
(1) if A is true then return;
(2);
(3) call **while-do**.