论题 1-4 作业

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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。

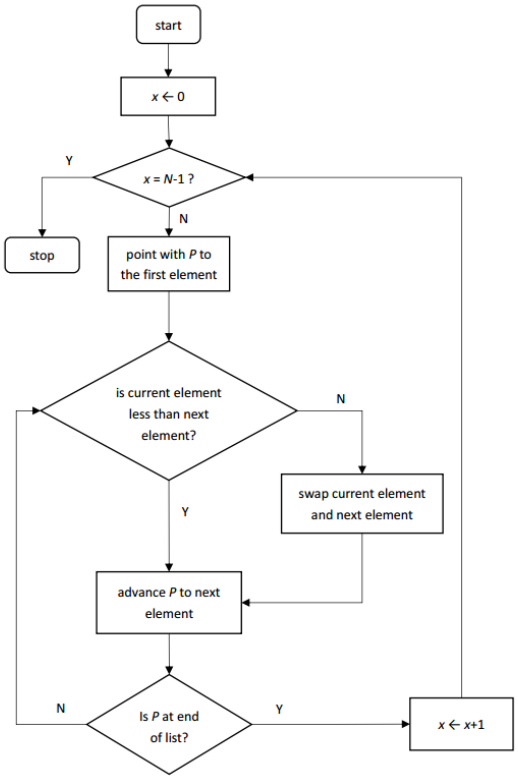
2 [DH] Problem 2.2

(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。

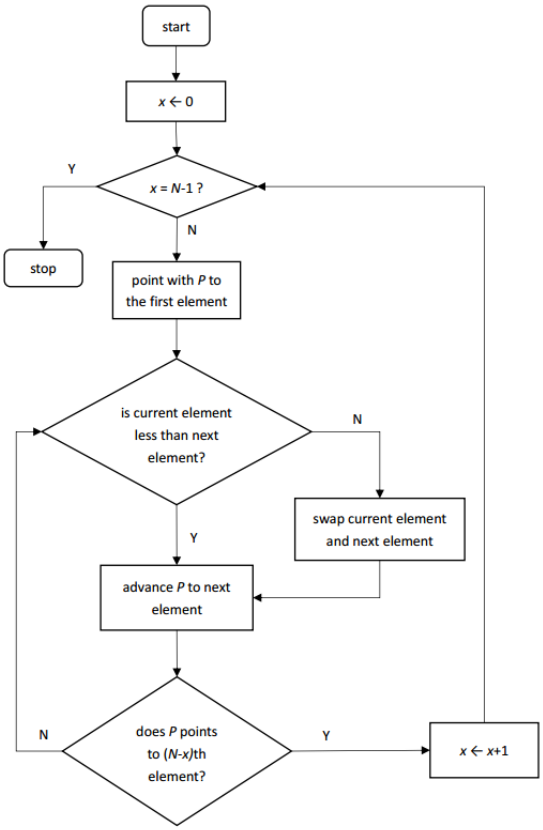
(b) (1) $I \leftarrow 0$;
(2) do the following N times:
(2.1) point to the first element;
(2.2) do the following $N-I$ times:
(2.2.1) compare the element pointed to with the next element;
(2.2.2) if the compared elements are in the wrong order, exchange them;
(2.2.3) point to the next element;
(2.3) $I \leftarrow I+1$.

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) $\cdots\cdots$;
(2.2) $I \leftarrow I + 1$.

(b) (1) $t \leftarrow$ false;
(2) while A is true and t is false do the following;
(2.1) $\cdots\cdots$;
(2.2) $t \leftarrow$ true;
(3) while A is false and t is false do the following;
(3.1) $\cdots\cdots$;
(3.2) $t \leftarrow$ 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) $\cdots\cdots$;

(3) call **while-do**.