第 6 讲: 算法方法

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评分： ______　　**评阅：** ______

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请独立完成作业，不得抄袭。
若得到他人帮助, 请致谢。
若参考了其它资料，请给出引用。
鼓励讨论，但需独立书写解题过程。

1　作业 (必做部分)

题目 1 (DH 4-8)
Prove that the maximal distance between any two points on a polygon occurs between two of the vertices.

解答：
Assume that the maximum distance between any two points on a polygon will not occur between two vertices
The maximum distance between a and b of a polygon with y sides is assumed to have x sides.
We know that the maximum distance between any two points on a polygon will not occur between two vertices.
So we can conclude that x→b can form a polygon with (y - x + 1) sides.
Then the problem can be described as the minimum distance of two points is not a straight line, we know that this does not work in all cases.
Therefore, we can show that the maximum distance between any two points on a polygon occurs between two vertices.

题目 2 (DH 4-9)
Write a program implementing the maximal polygonal distance algorithm

解答：
The input is a polygon $P = \{p_1, ..., p_n\}$. 致谢 csdn 博主 (伪代码在下一页)

题目 3 (DH 4-12)
Write high-level pseudocode of the greedy algorithm described in the text for finding a minimal spanning tree.

```
procedure MAX($P = \{p_1, ..., p_n\}$)
    p0 = pn;
    q = NEXT[p];
    while Area(p, NEXT[p], NEXT[q]) > Area(p, NEXT[p], q) do
        q = NEXT[q];
        q0 = q;
        while q != p0 do
            p = NEXT[p];
            print(p, q);
            while Area(p, NEXT[p], NEXT[q]) > Area(p, NEXT[p], q) do
                q = NEXT[q];
                if (p, q) != (q0, p0) then
                    print(p, q);
                elsereturn;
                end if
            end while
            if Area(p, NEXT[p], NEXT[q]) = Area(p, NEXT[p], q) then

                if (p,q)!=(q0,p0) then
                    print(p, NEXT[q]);
                elseprint(NEXT[p],q)
                end if
            end if
        end while
    end while
end procedure
```

```
procedure GREEDY($C, Q[], W[], P[]$)
    profit←0
    while C ≠0 do
        max←0
        I←0
        for i from 1 to N do
            if P[i] / W[i] > max and Q[i] ≠ 0 then
                max = P[i] / W[i]
                I = i
            end if
        end for
        C = C - W[I]
        profit = profit + P[I]
    end while
    return profit
end procedure
```

解答：

题目 4 (DH 4-13)

解答：
(a)
(b)The maximal profit is 194.

```
procedure DP($C, N, Q[], w[], p[]$)
    dp[0,...,C] = 0
    for $i \leftarrow 1, N$ do
        for $j \leftarrow C, w[i]$ do
            for $k \leftarrow 0, min(q[i], j/w[i])$ do
                dp[j] = max(dp[j], dp[j - k * w[i]] + k*p[i])
            end for
        end for
    end for
    print(dp[C])
end procedure
```

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2 作业 (选做部分)

题目 1 (DH 4-10)

解答：

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3 Open Topics

本周 OT 关注搜索技术。

Open Topics 1 (Alpha–Beta Pruning)
请介绍 Alpha-Beta 剪枝技术，包括概念、方法、应用 (比如在双人游戏中) 等。
参考资料:

- Alpha–beta pruning @ wiki
- “An Analysis of Alpha-Beta Pruning” @ AI’1975 (可选)

解答：

Open Topics 2 (SAT Solver)
请介绍 SAT 的求解算法。
参考资料

- Solving SAT @ wiki
- DPLL algorithm @ wiki
- Examples (可选)

4 反馈