**并行与分布式计算导论 作业 1**

**PDC 2024s Homework 1**

**截止期限 2024 年 3 月 15 日 23:59**

**DDL: 2024 Mar. 15 23:59 (GMT+8)**

1. 一个程序串行执行时，60%的执行时间花费在了可并行化的函数上。请计算，

该程序分别使用 6 个和8个处理器并行执行时，能达到的最大加速比是多少。

When a program is executed serially, the parallelizable functions take 60% of the execution time. What is the maximum speedup that can be achieved when the program is executed in parallel with 6 and 8 processors, respectively?

2. 根据所示的任务依赖图，回答下列问题。

According to the task dependency graph shown, answer the following questions.

Task8

Task2

Task5

8

4

Task10

Task7

Task1

Task3

2

3

7

6

9

Task9

Task6

Task4

4

2

5

圈内表示该任务执行所需的时间。

The number in the circle represents the execution time of the task.

（1） 请指出该任务依赖图的关键路径；

What is the critical path of the task dependency graph?

（2） 请指出该任务的最大并行度；并计算若达到最小运行时间，需要的处理器数量；

What is the maximum parallelism of this task? Calculate the number of processors required if the minimum execution time is reached.

（3） 试计算，使用 2 个和 3 个处理器时，分别的并行效率（parallel efficiency）。

Calculate the parallel efficiency when the program is executed in parallel with 2 and 3 processors respectively.