# 高性能计算导论 第一次作业

## Exercise 1.1



Devise formulas for the functions that calculate **my\_first\_i** and **my\_last\_i**  in the global sum example. Remember that each core should be assigned roughly the same number of elements of computations in the loop. Hint: First consider the case when n is evenly divisible by p.

为全局总和例子中的my\_first\_i和my\_last\_i推导一个公式。需要注意的是，在循环中，需要给各个核分配数目大致相同的计算元素。提示：先考虑n能被p整除的情况。

## Exercise 1.6

Derive formulas for **the number** of receives and additions that core 0 carries out using

1. The original pseudo-code for a global sum, and
2. The tree-structured global sum.

Make a table showing the numbers of receives and additions carried out by core 0 when the two sums are used with 2,4,8,...,1024 cores.

在下列情况中，推导公式求出0号核执行接收与加法操作的次数

1. 最初的全局总和的伪代码
2. 树形结构求全局总和

制作一张表，比较两种算法在总核数2、4、8、…、1024时，0号核接受与加法操作的次数。

## Exercise 1.7

The first part of the global sum example—when each core adds its assigned computed values—is usually considered to be an example of data-parallelism, while the second part of the first global sum—when the cores send their partial sums to the master core, which adds them—could be considered to be an example of task-parallelism. What about the second part of the second global sum—when the cores use a tree structure to add their partial sums? Is this an example of data- or task-parallelism? Why?

全局总和例子中的第一部分（每个核对分配给他的计算值求和），通常认为是数据并行的例子，而第一个求全局总和例子的第二部分（各个核将他们计算出的部分和发送给master核，master核将这些部分和再累加求和），认为是任务并行。第二个全局和例子的第二部分（各个核使用树形结构累加他们的部分和），是数据并行的例子还是任务并行的例子？为什么？

## Exercise 1.9

Write an essay describing a research problem in your major that would benefit from the use of parallel computing. Provide a rough outline of how parallelism would be used. Would you use task- or data-parallelism? if you don’t have personal experience, just present an example known from other course, book, internet or even private communication. For this example, briefly describe how the computation can be parallelized, and is there data parallelism or task parallelism?

写一篇文章，描述你研究方向中由于使用并行计算而获利的课题。大致描述是如何使用并行计算的，你将用到数据并行还是任务并行。如果你没有这方面的经历，亦可列举一个在其他课程、书本、网络、交谈中了解到的课题。并介绍该课题是如何使用并行计算的，该计算式数据并行还是任务并行。

不超过500字或400 words。