First FHPC Assignment

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1 PREVIEW

In this assignment we will present the following subjects:

- the production of a parallel program code
- the graphs of the theoretical and real speedup of the code
- anything else

Figure 1.1: Photo of a parallel program

2 SECTION 0

2.1 Laptop theoretical peak performance

We want to calculate the theoretical peak performance of our own portable computer by using the formula $theoretical peak performance = clock_f requency x FLOPs x number of cores$. We gather that $clock frequency = 2.90 Ghz, FLOP = 16$ and $number of cores = 2$ for our computer architecture, an intel i7 with a kaby lake microarchitecture; thus we compute $theoretical peak performance$ 92.8 $GFlops/s$

	Your model	CPU	Frequency	Number of Cores	Peak Performance
laptop	Asus F556U	Intel Core i7-7500	2.90 GHz	2	92.8 GFLOPs/s

quanti cicli ci vogliono? pensiamo che sia 1 = 1*vector$_s ize * 2 * fma$
numero di operazioni in double precision

2.2 Smartphone theoretical peak performance

We installed "'Mobile Linpack"' app and we run a few test. We report here some results,even on repeated trials:

	Model	Sustained performance	Matrix size	Peak performance	Memory
Cellphone	Samsung Galaxy XCover 4	114,81 Mflops/s	250	not calculated	16,00 GB
		145.53 Mflop/s	500		
		157.5 Mflop/s	800		
		201.32 Mflop/s	800		
		155.93 Mflop/s	900		
		109.88 Mflop/s	1000		
		201.32 Mflop/s	2000		

Let's check now whether our technologies would have competed with the Top500 supercomputers in the past:

	Model	Performance	Top 500 year& position	number 1 HPC system
Smartphone	Samsung Galaxy XCover 4	114,81 Mflops/s	250	not calculated
Laptop	ASUS F556U	92.8 GFLOPs/s	500	
		157.5 Mflop/s	800	
		109.88 Mflop/s	1000	

3 UNDERSTANDING TEXT

3.1 How much wood would a woodchuck chuck if a woodchuck could chuck wood?

3.1.1 Suppose "chuck" implies throwing.

According to the Associated Press (1988), a New York Fish and Wildlife technician named Richard Thomas calculated the volume of dirt in a typical 25–30 foot (7.6–9.1 m) long woodchuck burrow and had determined that if the woodchuck had moved an equivalent volume of wood, it could move "about **700 pounds (320 kg)** on a good day, with the wind at his back".

3.1.2 Suppose "chuck" implies vomiting.

A woodchuck can ingest 361.92 cm^3 (22.09 cu in) of wood per day. Assuming immediate expulsion on ingestion with a 5% retainment rate, a woodchuck could chuck **343.82 cm^3** of wood per day.

BONUS: SUPPOSE THERE IS NO WOODCHUCK. Fusce varius orci ac magna dapibus porttitor. In tempor leo a neque bibendum sollicitudin. Nulla pretium fermentum nisi, eget sodales magna facilisis eu. Praesent aliquet nulla ut bibendum lacinia. Donec vel mauris vulputate, commodo ligula ut, egestas orci. Suspendisse commodo odio sed hendrerit lobortis. Donec finibus eros erat, vel ornare enim mattis et.

4 INTERPRETING EQUATIONS

4.1 Identify the author of Equation 4.1 below and briefly describe it in English.

$$P(A|B) = \frac{P(B|A)P(A)}{P(B)} \tag{4.1}$$

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4.2 Try to make sense of some more equations.

$$\begin{aligned}
(x+y)^3 &= (x+y)^2(x+y) \\
&= (x^2 + 2xy + y^2)(x+y) \\
&= (x^3 + 2x^2y + xy^2) + (x^2y + 2xy^2 + y^3) \\
&= x^3 + 3x^2y + 3xy^2 + y^3
\end{aligned} \tag{4.2}$$

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$$A = \begin{bmatrix} A_{11} & A_{21} \\ A_{21} & A_{22} \end{bmatrix} \tag{4.3}$$

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5 VIEWING LISTS

5.1 Bullet Point List

- First item in a list
  - First item in a list
    * First item in a list
    * Second item in a list
  - Second item in a list
- Second item in a list

5.2 Numbered List

1. First item in a list
2. Second item in a list
3. Third item in a list

Per 50g	Pork	Soy
Energy	760kJ	538kJ
Protein	7.0g	9.3g
Carbohydrate	0.0g	4.9g
Fat	16.8g	9.1g
Sodium	0.4g	0.4g
Fibre	0.0g	1.4g

Table 6.1: Sausage nutrition.

6 INTERPRETING A TABLE

6.1 The table above shows the nutritional consistencies of two sausage types. Explain their relative differences given what you know about daily adult nutritional recommendations.

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7 READING A CODE LISTING

Listing 1: Luftballons Perl Script.

```perl
#!/usr/bin/perl

use strict;
use warnings;

for (1..99) { print $_." Luftballons\n"; }

# This is a commented line

my $string = "Hello World!";

print $string."\n\n";

$string =~ s/Hello/Goodbye Cruel/;

print $string."\n\n";

finale();

exit;

sub finale { print "Fin.\n"; }
```

7.1 How many luftballons will be output by the Listing 1 above?

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7.2 Identify the regular expression in Listing 1 and explain how it relates to the anti-war sentiments found in the rest of the script.

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