Homework 3

(Due date: Nov. 2nd)

PROBLEM 1 (20 PTS)

- Refer to Activity 6 in the High-Performance $Embedded\ Programming\ with\ the\ Intel®\ Atom^{TM}\ platform o Tutorial\ 5$
 - ✓ Activity 6 Grayscale Image Morphology: Execute the application so that it generates the uchip_d.bof and uchip_e.bof files. Provide a screenshot of the execution in the Terminal (erosion or dilation) and complete Table I. (20 pts)
 - * Embed the image in your Homework 3 document.

TABLE I. COMPUTATION TIME (US) OF DILATION/EROSION. DE21-150 BOARD

	Computation Time (us)	
	Sequential	ТВВ
Dilation		
Erosion		

PROBLEM 2 (30 PTS)

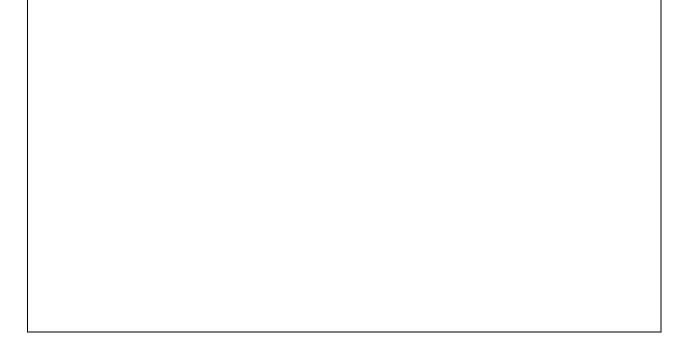
• In the following code snippet, we apply this transformation to the elements of the vector \vec{x} . The result is a vector \vec{r} :

$$r(i) = \frac{1}{1 + e^{-x(i)}}, i = 0, ..., n - 1$$

```
double tmp;
double *x, *r;
x = (double *) calloc (1000, sizeof(double));
r = (double *) calloc (1000, sizeof(double));

tbb:parallel_for (int(0), int(1000), [&] int i) {
   tmp = 1 + exp(-x[i]);
   r[i] = 1/tmp;
   });
...
```

- ✓ If your own words, explain why this code might not generate correct results all the time.
- ✓ How would you fix the code so that correct results are guaranteed?



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PROBLEM 3 (30 PTS)

- Refer to the Activity 1 in the High-Performance Embedded Programming with the Intel® Atom™ platform → Tutorial 7
 ✓ Activity 1 Modulus. Execute the application. Provide a screenshot of the execution in the Terminal. (10 pts)
 * Embed the image in your Homework 3 document.
- Based on the completion of the Activity 1 (3-stage pipeline), answer the following questions: (20 pts)
 - ✓ Stage 1, whose functor is my_in(a,b,n), has no input (only a flow_control object is passed to the functor). Stage 1 feeds input data items into the pipeline and notifies the pipeline when there are no more items in the input stream.
 - What type are the input data items? How many bytes does an input data item occupy?
 - Where in the functor definition code (you can copy and paste the code line) is the output of Stage 1 generated?
 - ✓ Stage 2: Its associated functor is my transf(). This functor has no input parameters.
 - Where in the functor definition code does Stage 2 read its incoming data?
 - Where in the functor definition code is the output of Stage 2 generated?
 - ✓ Stage 3, whose functor is my out (c):
 - Is the input data to Stage 3 the same as the input parameters of the functor?
 - Where in the functor definition code does Stage 3 read its incoming data?
 - Since, syntax-wise, Stage 3 has no output, how do we store the result for each incoming data item?

PROBLEM 4 (20 PTS)

- Attach your Project Status Report (no more than 1 page, single-spaced, 2 columns, only one submission per group). This report should contain the initial status of your project. For formatting, use the provided template (Final Project Report Template.docx). The sections included in the template are the ones required in your Final Report. At this stage, you are only required to:
 - ✓ Include a title and a (draft) project description.
- Only one student is needed to attach the report (make sure to indicate all the team members).

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