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December 20, 2016

The selection committee for the EDCs Outstanding TA Award

**Re: Nominating Mr. Omar Hesham for the Outstanding TA  
Award**

Dear Sir/Madam,

It is truly a pleasure to nominate Mr. Omar Hesham for the Outstanding TA Award. Mr. Hesham has worked with me as a TA for the Computer Organization (SYSC 3006) course that I taught during the Fall 2016 term. To put matters in perspective, I have taught 10 courses with the Department of Systems and Computer Engineering since 2013. During these course I supervised 50+ TAs with diverse backgrounds, capabilities, and working habits. Of all the TAs that I worked with, Omar stands out as the most dedicated, approachable, reliable, energetic and self-motivated. His contributions in the course, are not just in assisting with the labs and explaining the material to students, but also in reassuring the students and providing a collegial learning atmosphere in his labs. In the following five paragraphs I will elaborate on each of the aspects outlined in the nomination guidelines.

*Teaching Skills* In the Computer Organization course, the student is taught how to build a complete microprocessor from basic components. The material is atypically challenging for students to grasp. As such, the course relies heavily on a lab component that enables the student to acquire the confidence necessary to undertake this intricate task. Towards that end, Omar took it upon himself to modify the lab notes from previous years to ensure synchronism with lectures. This is quite a demanding task that involved

well beyond standard lab preparation. It required revising assembly codes and hardware signals to match lectures. Omar would send me the updated material before the labs, usually with annotations to describe where he expected the students to struggle. Omar did that consistently for all 10 labs with unprecedented diligence and perseverance. Omar used to stay with students after the lab to explain and discuss theoretical and practical aspects of the course. I received numerous comments from the students acknowledging his help and support.

*Grading* As a TA, Omar was involved in marking the midterm and quizzes for the Computer Organization course. The number of students in this class is 132, which makes marking tedious and time-consuming. Given his hands-on experience in the lab, I retained all the design questions for Omar to mark. This is because design questions may have numerous solutions and only a person with expertise and patience can assess the various approaches that the students may develop for one design problem. Omar has been always consistent in his marking. I have not received a single complaint from all the 132 students for the questions he marked. His marking was understanding of the student's approach, but at the same time firm and on solid footing. Omar would mark mistakes in red with a brief note next to each one explaining what the student could have done to avoid it. Once again, I received comments from the students confirming what I personally observed.

*Communication:* Omar is a decent soft-spoken individual. He thinks before he speaks without being argumentative. When he revised the labs, he would send me the modified material with comments indicating the changes. I never had to revert to the original material because in my view Omar's work was just perfect. In three occasions Omar took it upon himself to post explanatory comments on the course website. I never had a TA who cared to do that. No other TA in the past considered posting anything on the course CULearn forum. His comments were exact and to the point. Omar responds to email and meeting requests within minutes. This makes him always ready to intervene to deal with emergency situations like power outages; a situation that he, along with another TA, had to deal with when the entire Mackenzie building had to be shut down. Omar was there rescheduling students and checking them out of the lab.

*Environment:* From my observation, I could tell that Omar has been inclusive. I have never heard him comment on students in a negative way. He is professional in dealing with them, reassuring, helpful and friendly all along.

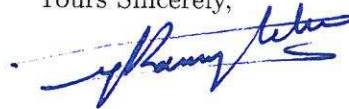
He is extremely respectful of me and the students. This demeanour earned him my respect and that of his peers and his students alike.

*Other* It is worth noting that before I took over, the Computer Organization course was taught by Professor Trevor Pearce. When Professor Pearce learned that Omar will be working with me, he sent me a "congratulations" note. This speaks volumes; it is not only my observation, but other professors' as well. I would also like to comment on Omar's discipline. Omar has always been on time, even when Ottawa was hit by big snow storms. This happened in the final exam on December 17, 2016. Many TAs across campus did not show up on time for proctoring. Omar was there well before the allocated time. He undertook his duties with his natural diligence and courtesy.

To conclude, I consider myself to be extremely fortunate to have worked with Omar Hesham. I would not have believed that such a TA could be found at Carleton. I had not seen one until I met Omar. It is not about Omar receiving this prestigious award, it is about Carleton acknowledging the work of the sincere and dedicated. It is to send a message to other TAs that their diligence and respect will not go unnoticed. Granting Omar this award will boost his morale and will make him give Carleton even more.

Omar's nomination has my strongest support and I will be extremely happy to provide any further information about his work and nomination should this be necessary. To complete the nomination, samples of Omar's work are appended to this letter.

Yours Sincerely,



Ramy H. Gohary, Ph.D.  
Adjunct Research Professor  
Senior Research Associate, and  
Project Manager



## Appendix. Samples of Omar's TA work

### 1. Online (cuLearn) Posts and Lab Preparation

Omar's teaching style emphasizes intuition-building and visual learning; and this is reflected in his writings, whether through cuLearn posts that address emerging student questions, or through Lab materials that adapt to new course requirements. When possible, he uses illustrations to help the student visualize the final goal of the lab, and build a mental image to work towards.

Excerpts from Omar's writing on cuLearn (left) and lab material (right):

**Carry vs Overflow**  
by Omar Hesham - Friday, 21 October 2016, 3:08 AM

Hi everyone,

In this post, we go through a quick reminder of the logic behind Carry vs Overflow. It's a topic that's been adequately covered in previous courses, SYSC3006 lectures, quizzes and labs. But if you're still a bit shaky on the distinction, this post should help.

#### 1. Motivation

Carry and Overflow values have two very *independent* meanings, but are often confused due to the shorthand tricks we use to design their circuits with. We aim to clarify these misconceptions and work our way slowly to understand where those optional "tricks" come from. Let's start with the Carry value.

#### 2. Carry

When deciding the Carry value (or Carry 'flag' in an ALU implementation) of an arithmetic addition between two numbers, we should only concern ourselves with the *mechanics of binary addition*. That is, we don't consider what the interpretation of the values is (signed, unsigned, liberal, banana, etc. it just doesn't matter).

For instance, let's perform the 4-bit addition of the binary numbers 1111 and 110:

```
  1111
+ 0110
-----
 10101
```

#### Lab Overview

This lab will gently introduce the interactions between software and I/O devices. Specifically, you will develop an assembly program which displays a constantly changing value onto a two-digit display device.

The "display" part is where I/O comes in; but we'll start with the basics first. In Fragment 1, we'll take a given value and store it (after proper formatting) into two registers that we'll initially treat as our -very primitive- output devices. In Fragment 2, we'll introduce an I/O Switch component to interact with the software and control whether we're incrementing or decrementing that value. Finally, in Fragment 3, we'll display the value on the Digit Display I/O device, instead of just storing the values in registers (which are typically hidden from a human user).

Lab progression is summarized below (all I/O devices can be found in the Debugger):

Fragment 1: Compute and store R1's decimal digits into registers.

Fragment 2: User input (via I/O Switch) to control if value is incrementing or decrementing.

Fragment 3: Decimal value output (via I/O Digit Display device).

Sample of student responses to Omar's cuLearn post on Carry vs Overflow:

Mujaheed Khan

Thu 10/20, 9:40 PM

Omar Hesham ✓

Inbox

Thank you so much! This really did clarify my confusion!

Marwan Refaei <MarwanRefaei@gmail.carleton.ca>

Thu 10/20, 3:36 PM

omar.hesham@carleton.ca ✓

Inbox

Omar-san,

Thank you for the humorous yet extremely useful summary that you emailed to us earlier. It helped clear up a few things.

Just thought I owe you some feedback.

Sincerely,  
Marawan Refaei

Khaled Abu Moh'D

Thu 10/20, 3:48 PM

Hi Omar,

Thank you so much. This post helped me a lot.

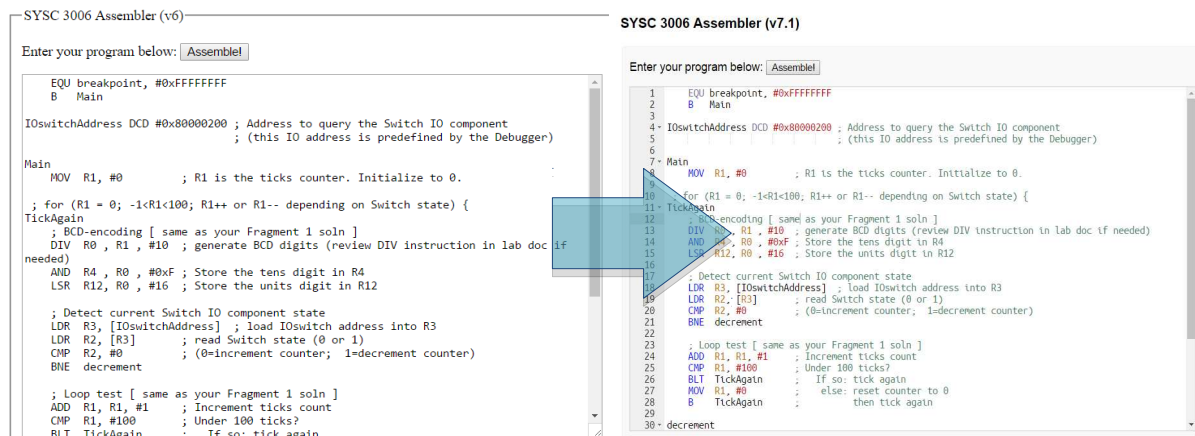
Khaled

👍 💰 Reply all ▼

## 2. Course Tool Improvements

2.1. SYSC3006 uses an in-lab Assembler tool (originally developed by Prof. Trevor Pearce) to allow the students to write and compile ARM assembly code. Omar sought to improve the usability of the tool by contributing bug fixes, line-numbering, in-line error reporting, and custom syntax highlighting.

Care was taken to ensure the syntax highlighting was still discernable even for students with color-blindness (Deuteranopia, Protanopia, and Tritanopia).



2.2. Omar also recorded a video documenting the entire Code > Assembly > Debugging pipeline, as a reference for the students (who often, understandably, forget parts of the procedure, as they juggle a handful of other courses and their associated tools). Care was taken to ensure that the video was clear and the steps well-understood *without* any audio.

The short video was a success, cutting down on the time spent (re)teaching the tools every lab, and allowing the TAs to dedicate more time to the lab's learning objectives.

URL: <https://www.youtube.com/watch?v=qseZtaTdMu4>

