Computer Architecture
CS 325 - ON40
Department of Physics and Computer Science
Medgar Evers College
Exam 1

Direction: Submit your typed work in the Exams directory of your github repository and/or as an attachment on Google classroom under the Exam01 assessment. All submissions should have their appropriate extensions.

Problem	Maximum Points	Points Earned
1	5	
2	5	
3	5	
4	5	
Total	20	

1. Name and describe the four main components of a single processor computer.
2. Provide a paraphrase of Moore's Law and state three consequences of the law.
3. Name all the registers of the IAS computer, and then, state the purpose of any four of the registers.
4. Convert each of the following binary numbers to decimal numbers. You must show work to receive full points
   a. 1110.0111
   b. 1110001.01
   c. 10000.101
   d. 110010.1001
   e. 1111000
5. **Extra Credit**
   When dealing with the performance of a computer a mean value of benchmarks of a computer is calculated. One algorithm used to calculate the mean value is

$$\begin{aligned} \text{Harmonic Mean} &= \frac{n}{\sum_{i=1}^{n}\left(\frac{1}{x_i}\right)} \\ &= \frac{n}{\frac{1}{x_1}+\frac{1}{x_2}+\ldots+\frac{1}{x_n}} \end{aligned}$$

   where n is the number of benchmarks and $x_1, x_2, \ldots, x_n$ are real numbers.
   Write the function `HarmonicMean()` whose header is

```
double HarmonicMean(ifstream& in)
```

   if the file referenced by *in* is open, the function will return the harmonic mean of the numbers in the file. Assume that the file only consists of nonnegative numbers. If a zero is read, it must be excluded from the mean. If the file is not open or the file contains no valid values for the mean, the function must return 0.