COMP 222 Computer Organization
Assignment #1—Measuring Performance

Objective:

To calculate the average CPI, the execution time, and MIPS of a sequence of instructions, given the number of instruction classes, the CPI and total count of each instruction type, and the clock cycle rate (frequency) of a particular machine.

Inputs:

- Number of instructions classes (types)
- CPI each type of instruction
- Total count of each type of instruction (in billions)
- Clock rate of machine (GHz)

Output:

- Average CPI of the sequence of instructions
- Total CPU processing time (seconds) of the sequence of instructions
- MIPS of the sequence of instructions

Specification:

The program calculates the output based on choosing from a menu of choices, where each choice calls the appropriate procedure, where the choices are:

1) Enter parameters
2) Calculate the average CPI of a sequence of instructions
3) Calculate the execution time of a sequence of instructions
4) Calculate the MIPS of a sequence of instructions
5) Quit program

What to do:

- Make sure all calculations are displayed truncated to 2 decimal fractional places, using the format **"%.2f"** in the printf statements.
- Make sure that the total execution time is measured in seconds.
- Make sure your code compiles with zyBooks' zyLabs compiler--if it does not compile with zyBooks' compiler it will be graded as not compiling, even if it compiles on your compiler on your desktop/laptop at home
- To typecast an int **x** to a float **y**, use **y=(float)x or** simply **y=1.0*x**
- Feel free to use the template "skeleton" code provided on Canvas for the assignment

What NOT to do (any violation will result in an automatic score of 0 on the assignment):

- Do NOT modify the choice values (1, 2, 3, 4, 5) or input characters and then try to convert them to integers--the test script used for grading your assignment will not work correctly.
- Do NOT turn in an outdated version of the assignment downloaded from the Internet (coursehero, github, etc.) or a version that was coded by someone else (former student, tutor, etc.)
- Do NOT use any self-created or external libraries that cannot be located/utilized by zylabs
- Do NOT turn in your assignment coded in another programming language (C++, C#, Java, Python, Perl, etc.)—it will NOT compile under zyLabs C compiler.

What to turn in:

The source code as a single C file uploaded to Canvas (http://canvas.csun.edu) by the deadline of 11:59pm PST (-20% per consecutive day for late submissions, up to the 4th day—note 1 minute late counts as a day late, 1 day and 1 minute late counts as 2 days late, etc.).

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Measuring Performance:
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1) Enter parameters
2) Calculate CPI of a sequence
3) Calculate Execution time of a sequence
4) Calculate MIPS of a sequence
5) Exit program

Enter selection: 1
Enter the number of instruction classes: 3
Enter the frequency of the machine (GHz): 2.5
Enter CPI of class 1: 1
Enter instruction count of class 1 (billions): 6
Enter CPI of class 2: 3
Enter instruction count of class 2 (billions): 4
Enter CPI of class 3: 5
Enter instruction count of class 3 (billions): 2

Measuring Performance:
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1) Enter parameters
2) Calculate CPI of a sequence
3) Calculate Execution time of a sequence
4) Calculate MIPS of a sequence
5) Exit program

Enter selection: 2
The average CPI of the sequence is: 2.33

Measuring Performance:
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1) Enter parameters
2) Calculate CPI of a sequence
3) Calculate Execution time of a sequence
4) Calculate MIPS of a sequence
5) Exit program

Enter selection: 3
The execution time of the sequence is: 11.20 sec

Measuring Performance:
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1) Enter parameters
2) Calculate CPI of a sequence
3) Calculate Execution time of a sequence
4) Calculate MIPS of a sequence
5) Exit program

Enter selection: 4
The total MIPS of the sequence is: 1071.43

Measuring Performance:
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1) Enter parameters
2) Calculate CPI of a sequence
3) Calculate Execution time of a sequence
4) Calculate MIPS of a sequence
5) Exit program

Enter selection: 5
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