Hadassah Academic College

Department of Computer Science

Computer Architecture **Exercise 3**

Consider the following SPEC CINT2017 results on two Intel CPUs:

CPU	Clock Rate	Cores	Parallel Compilation	CINT2017
Xeon 5160	3.0 GHZ	4	No	5.20
Intel Core i7-5960X	4.0 GHZ	6	Yes	8.98

1. Find the expected SPEC CINT2017 score for the Core i7 if its clock rate were 3.0 GHz.
2. Find the speedup of the Core i7 relative to the Xeon 5160 if both run at 3.0 GHz.
3. Assume that the compilation for the Core i7 uses all 6 cores, so that some proportion F_p of the program runs in parallel.

   Assume that the Xeon 5160 (without parallel compilation) runs the program sequentially on one core.

   From the speedup that was found in question 2, use the Amdahl equation

   $$S = \frac{1}{1 - F_p + \frac{F_p}{N}}$$

   to find F_p (the relative proportion of the program that the compiler was able to parallelize).
4. Find the expected score for the Core i7 on SPEC CINT2017 if it is possible to make a 30% improvement on 50% of the run time.