

Report Assignment 4

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The following table shows the number of cycles taken, the number of times the OF stage was needed to stall because of a data hazard, and the number of times an instruction on a wrong branch path entered the pipeline for the programs that were submitted in assignment 1.

| Program | Cycles | OF stages stalled | Wrong Branch |
|----------------|--------|-------------------|--------------|
| descending.asm | 475 | 107 | 88 |
| even-odd.asm | 14 | 6 | 0 |
| fibonacci.asm | 124 | 27 | 16 |
| palindrome.asm | 95 | 37 | 7 |
| prime.asm | 45 | 9 | 5 |

Table 1: Table

Observations :-

The utilization of pipelining in processors often leads to encountering data hazards and control hazards multiple times, resulting in an increase in the number of cycles required compared to non-pipelined processors. To address these hazards, NOP instructions are inserted to stall the pipeline stages and rectify any incorrect paths taken, consequently increasing the count of dynamic instructions.