

## ASSIGNMENT TO PIPELINING QUESTION

**NOTE:**From the slide it was mentioned that a single floating point addition will take **7 nanoseconds**.

**Therefore:**1000 = Number of floating point additions to perform

7ns = time per addition

**Resulting To:**

$1000 * 7 = 7000 \text{ ns}$  (in no Pipelining)

### PIPELINING

In pipelining, once the first addition has passed through Stage 1, we can begin the second addition immediately.

**Therefore:**

Total Time =  $7 + (N - 1) * 1$

=  $7 + (1000 - 1) * 1$

=  $7 + 999 = 1006 \text{ ns}$

### MULTIPLE ISSUE

We have 2 floating-point adders, therefore we can process 2 additions per cycle.

Total Time For Multiple Issue =  $7 + ((1000 - 1) \setminus 2) * 1$

=  $7 + 499.5 = 506 \text{ ns}$

### CONCLUSIVELY:

In our example with 1000 additions, dual-issue pipelining completed the task nearly 14× faster than non-pipelined execution and about 2× faster than single-issue pipelining.

**Therefore Multiple Issue Is More Efficient**