Instructions to operations translation:
Note: Every instruction needs to do PC walk (named by myself) at first. If there is no pipeline, instruction fetch is the first work we need to do. (If there is pipeline, we could do next instruction fetch when execute the previous instruction.) It is same for all

Add instruction example:
Note: For add, PC = PC + 4 is updated by itself, the execute unit won't give value to PC. So, the PC update and instruction execute could do simultaneously.

Add rd, rs, rt
PC walk:
Cycle 1:
PC -> PC_DEM -> LPC_LSadd
Cycle 2:
LPC_LSadd -> Address_MUX -> LLS_Address
Cycle 3:
LLS_Address -> L/S unit -> LLoaddata
Cycle 4:
LLoaddate -> Load_DEM -> LINS
Cycle 5:
LINS -> Instruction decoder -> (LRD, LRS, LRT, LL, Lopcode)
Cycle 6:
Lopcode -> Instruction Look-Op Table -> Control signal array
All these 6 cycle are same for all the instructions

Execute (control signal array begin to control the execute unit):
Cycle 7:
Immediate -> LIM (no use in add),
LRS -> LRS_DEM -> LRS_LRF1
LRT -> LRT_DEM -> LRT_LRF2
Cycle 8:
LRS_LRF1 -> LRF1_MUX -> LRF1
LRT_LRF2 -> LRF2_MUX -> LRF2
Cycle 9:
LRF1 -> RF -> LRFOUT1
LRF2 -> RF -> LRFOUT2
Cycle 10:
LRFOUT1 -> LRFOUT1_DEM -> LRFOUT1_L1
LRFOUT2 -> LRFOUT2_DEM -> LRFOUT2_L2
Cycle 11:
LRFOUT1_L1 -> L1_MUX -> L1
LRFOUT2_L2 -> L2_MUX -> L2
Cycle 12:
L1 -> L1_DEM -> LDEM1_1

L2 -> L2_DEM -> LDEM2_1

Cycle 13:

LDEM1_1, LDEM2_1 -> Adder -> LA1

Cycle 14:

LA1 -> LALU_MUX -> LALU

Cycle 15:

LALU -> LALU_DEM -> LALU_LRF1

LRD -> LRD_DEM -> LRD_LRF2

Cycle 16:

LALU_LRF1 -> LRF1_MUX -> LRF1

LRD_LRF2 -> LRF2_MUX -> LRF2

Cycle 17:

LRF1, LRF2 -> RF

Simultaneously, we can also update the PC' s value:

PC update cycle 1:

PC -> PC_DEM -> LPC_Add4

PC update cycle 2:

LPC_Add4 -> Add4 -> Ladd4_OUT

PC update cycle 3:

Ladd4_OUT -> PC_MUX -> PC

Note: As these operations are totally separated from the execute unit, we could update the PC' s value anytime.

If we want to update earlier (good for pipeline, begin instruction fetch earlier), we could do that in cycle 7, 8, 9.

If we want to update later (update finished when add instruction finish), we could do that in cycle 15, 16, 17.

Any time between them all works.