MacbookPro:Pipesim Life\$./run.sh

printout for the 3 forwarding settings on instruction.txt

```
Starting...
Forwarding is disabled.
Loading application...instruction.txt
Read file completed!!
Printing Application:
ADD r1 r2 r3
SUB r2 r3 r4
MULT r3 r1 r5
DIV r4 r3 r6
LW r5 r4
SW r5 r7
BNEZ r7 r8
Initializing pipeline...
Cycle IF ID
                                       EXEC
                                                          MEM
                                                                           WB
       ADD r1 r2 r3 *
1
      SUB r2 r3 r4 ADD r1 r2 r3 *
      MULT r3 r1 r5 SUB r2 r3 r4 ADD r1 r2 r3
DIV r4 r3 r6 MULT r3 r1 r5 SUB r2 r3 r4
DIV r4 r3 r6 MULT r3 r1 r5 *
3
                                                         ADD r1 r2 r3
4
                                                          SUB r2 r3 r4
5
                                                                         ADD r1 r2 r3
     LW r5 r4 DIV r4 r3 r6 MULT r3 r1 r5 *
LW r5 r4 DIV r4 r3 r6 * MUL
LW r5 r4 DIV r4 r3 r6 * *
SW r5 r7 LW r5 r4 DIV r4 r3 r6 *
6
                                                                           SUB r2 r3 r4
                                                          MULT r3 r1 r5
8
                                                                          MULT r3 r1 r5
9
10 SW r5 r7 LW r5 r4
11 SW r5 r7 LW r5 r4
12 BNEZ r7 r8 SW r5 r7
                                                          DIV r4 r3 r6
                                                                           DIV r4 r3 r6
                                        LW r5 r4
13 BNEZ r7 r8 SW r5 r7 14 BNEZ r7 r8 SW r5 r7
                                                          LW r5 r4
                                                                           LW r5 r4
1.5
                        BNEZ r7 r8 SW r5 r7
16
                                        BNEZ r7 r8
                                                         SW r5 r7
       *
17
                                                          BNEZ r7 r8
                                                                           SW r5 r7
1.8
                                                                          BNEZ r7 r8
Completed in 18 cycles.
Starting...
Forwarding is enabled with window size set to 1.
Loading application...instruction.txt
Read file completed!!
Printing Application:
ADD r1 r2 r3
SUB r2 r3 r4
MULT r3 r1 r5
DIV r4 r3 r6
LW r5 r4
SW r5 r7
BNEZ r7 r8
Initializing pipeline...
                                         EXEC
Cycle IF
              ID
                                                          MEM
                                                                           WB
      ADD r1 r2 r3
1
       SUB r2 r3 r4 ADD r1 r2 r3
2
      MULT r3 r1 r5 SUB r2 r3 r4 ADD r1 r2 r3
3
      DIV r4 r3 r6 MULT r3 r1 r5 SUB r2 r3 r4 ADD r1 r2 r3
DIV r4 r3 r6 MULT r3 r1 r5 * SUB r2 r3 r4
4
                                                          SUB r2 r3 r4
                                                                          ADD r1 r2 r3
                        DIV r4 r3 r6 MULT r3 r1 r5 *
      LW r5 r4
6
                                                                          SUB r2 r3 r4
                        LW r5 r4 DIV r4 r3 r6 MULT r3 r1 r5 *
7
      SW r5 r7
                        SW r5 r7 LW r5 r4
BNEZ r7 r8 SW r5 r7
8
       BNEZ r7 r8
                                                          DIV r4 r3 r6 MULT r3 r1 r5
                                                          LW r5 r4
                                                                          DIV r4 r3 r6
                                        SW r5 r7 LW r5 r4 DIV r4 r
BNEZ r7 r8 SW r5 r7 LW r5 r4
10
                                                          BNEZ r7 r8
                                                                         SW r5 r7
11
12
                                                                          BNEZ r7 r8
13
Completed in 12 cycles.
```

Starting...

```
Forwarding is enabled with window size set to 2.
Loading application...instruction.txt
Read file completed!!
Printing Application:
ADD r1 r2 r3
SUB r2 r3 r4
MULT r3 r1 r5
DIV r4 r3 r6
LW r5 r4
SW r5 r7
BNEZ r7 r8
Initializing pipeline...
                                    EXEC
                                                   MEM
Cycle IF
1
      ADD r1 r2 r3
       SUB r2 r3 r4
                     ADD r1 r2 r3
2
       MULT r3 r1 r5 SUB r2 r3 r4
                                   ADD r1 r2 r3
3
                     MULT r3 r1 r5 SUB r2 r3 r4 ADD r1 r2 r3
      DIV r4 r3 r6
      LW r5 r4
5
                     DIV r4 r3 r6 MULT r3 r1 r5 SUB r2 r3 r4
                                                                 ADD r1 r2 r3
       SW r5 r7
                      LW r5 r4
                                    DIV r4 r3 r6
                                                   MULT r3 r1 r5 SUB r2 r3 r4
7
      BNEZ r7 r8
                     SW r5 r7
                                    LW r5 r4
                                                   DIV r4 r3 r6 MULT r3 r1 r5
8
                     BNEZ r7 r8
                                    SW r5 r7
                                                   LW r5 r4
                                                                 DIV r4 r3 r6
                                                   SW r5 r7
                                                                 LW r5 r4
9
                                    BNEZ r7 r8
10
                                                   BNEZ r7 r8
                                                                 SW r5 r7
                                                                 BNEZ r7 r8
11
12
Completed in 11 cycles.
```

printout for the 3 forwarding settings on instruction2.txt

```
Starting...
Forwarding is disabled.
Loading application...instruction2.txt
Read file completed!!
Printing Application:
ADD r1 r2 r3
SW r1 r2
LW r7 r2
ADD r5 r7 r1
LW r8 r2
SW r7 r8
ADD r8 r8 r2
LW r9 r8
SW r9 r8
Initializing pipeline...
Cycle IF ID
                                  EXEC
                                                MEM
                                                              WB
Ω
      ADD r1 r2 r3 *
1
      SW r1 r2 ADD r1 r2 r3 *
2
                    SW r1 r2
3
      LW r7 r2
                                 ADD r1 r2 r3
      LW r7 r2
4
                   SW r1 r2
                                                ADD r1 r2 r3
5
     LW r7 r2
                    SW r1 r2
                                                              ADD r1 r2 r3
6
      ADD r5 r7 r1 LW r7 r2
                                  SW r1 r2
                    ADD r5 r7 r1 LW r7 r2
                ADD r5 r7 r1 *
7
      LW r8 r2
                                                SW r1 r2
     LW r8 r2
                                                             SW r1 r2
                                                LW r7 r2
     LW r8 r2
                    ADD r5 r7 r1 *
9
                                                             T.W r7 r2
10
      SW r7 r8
                    LW r8 r2
                                 ADD r5 r7 r1
11
     ADD r8 r8 r2 SW r7 r8
                                 LW r8 r2
                                                ADD r5 r7 r1
                                                              ADD r5 r7 r1
12
     ADD r8 r8 r2 SW r7 r8
                                                LW r8 r2
13
      ADD r8 r8 r2
                    SW r7 r8
                                                              LW r8 r2
                    ADD r8 r8 r2 SW r7 r8
14
      LW r9 r8
15
      SW r9 r8
                    LW r9 r8 ADD r8 r8 r2 SW r7 r8
16
      SW r9 r8
                    LW r9 r8
                                                ADD r8 r8 r2
                                                             SW r7 r8
                    LW r9 r8
17
       SW r9 r8
                                                              ADD r8 r8 r2
                    SW r9 r8
18
                                  LW r9 r8
19
                    SW r9 r8
                                                LW r9 r8
20
                    SW r9 r8
                                                              LW r9 r8
21
                                  SW r9 r8
22
                                                SW r9 r8
23
                                                              SW r9 r8
24
```

Completed in 23 cycles.

14

```
Starting...
Forwarding is enabled with window size set to 1.
Loading application...instruction2.txt
Read file completed!!
Printing Application:
ADD r1 r2 r3
SW r1 r2
LW r7 r2
ADD r5 r7 r1
LW r8 r2
SW r7 r8
ADD r8 r8 r2
LW r9 r8
SW r9 r8
Initializing pipeline...
                                     EXEC
                                                    MEM
Cycle IF
0
1
       ADD r1 r2 r3
       SW r1 r2
                      ADD r1 r2 r3
2
3
       LW r7 r2
                      SW r1 r2
                                     ADD r1 r2 r3
                                     SW r1 r2
4
       ADD r5 r7 r1
                      LW r7 r2
                                                    ADD r1 r2 r3
5
       LW r8 r2
                      ADD r5 r7 r1
                                     LW r7 r2
                                                    SW r1 r2
                                                                   ADD r1 r2 r3
      LW r8 r2
                      ADD r5 r7 r1
                                                    LW r7 r2
                                                                   SW r1 r2
7
       LW r8 r2
                      ADD r5 r7 r1
                                                                   LW r7 r2
8
       SW r7 r8
                      LW r8 r2
                                     ADD r5 r7 r1
       ADD r8 r8 r2 SW r7 r8
9
                                     LW r8 r2
                                                    ADD r5 r7 r1
10
       ADD r8 r8 r2
                      SW r7 r8
                                                    LW r8 r2
                                                                   ADD r5 r7 r1
                                                                   LW r8 r2
11
       ADD r8 r8 r2
                      SW r7 r8
                                     SW r7 r8
       LW r9 r8
12
                      ADD r8 r8 r2
13
       SW r9 r8
                      LW r9 r8
                                     ADD r8 r8 r2
                                                    SW r7 r8
14
                      SW r9 r8
                                     LW r9 r8
                                                    ADD r8 r8 r2
                                                                   SW r7 r8
15
                      SW r9 r8
                                                    LW r9 r8
                                                                   ADD r8 r8 r2
                      SW r9 r8
16
                                                                   LW r9 r8
                                     SW r9 r8
17
18
                                                    SW r9 r8
19
                                                                   SW r9 r8
2.0
Completed in 19 cycles.
Starting...
Forwarding is enabled with window size set to 2.
Loading application...instruction2.txt
Read file completed!!
Printing Application:
ADD r1 r2 r3
SW r1 r2
LW r7 r2
ADD r5 r7 r1
LW r8 r2
SW r7 r8
ADD r8 r8 r2
LW r9 r8
SW r9 r8
Initializing pipeline...
           ID
                                     EXEC
                                                    MEM
Cycle IF
1
       ADD r1 r2 r3
       SW r1 r2
2
                      ADD r1 r2 r3
       LW r7 r2
                                     ADD r1 r2 r3
3
                      SW r1 r2
       ADD r5 r7 r1
                      LW r7 r2
                                     SW r1 r2
                                                    ADD r1 r2 r3
       LW r8 r2
                                                                   ADD r1 r2 r3
                                     LW r7 r2
                                                    SW r1 r2
5
                      ADD r5 r7 r1
6
       LW r8 r2
                      ADD r5 r7 r1
                                                    LW r7 r2
                                                                   SW r1 r2
7
       SW r7 r8
                      LW r8 r2
                                     ADD r5 r7 r1
                                                                   LW r7 r2
                                                    ADD r5 r7 r1
8
       ADD r8 r8 r2
                      SW r7 r8
                                     LW r8 r2
       ADD r8 r8 r2
                      SW r7 r8
                                                    LW r8 r2
                                                                   ADD r5 r7 r1
                      ADD r8 r8 r2 SW r7 r8
10
       LW r9 r8
                                                                   LW r8 r2
11
       SW r9 r8
                      LW r9 r8
                                     ADD r8 r8 r2
                                                    SW r7 r8
                                     LW r9 r8
                                                    ADD r8 r8 r2 SW r7 r8
12
                      SW r9 r8
13
                                     SW r9 r8
                                                    LW r9 r8
                                                                  ADD r8 r8 r2
```

SW r9 r8

LW r9 r8

```
15
                                                                      SW r9 r8
16
Completed in 15 cycles.
```

printout for the 3 forwarding settings on instruction3.txt

```
Starting...
Forwarding is disabled.
Loading application...instruction3.txt
Read file completed!!
Printing Application:
ADD r1 r2 r3
SUB r2 r3 r1
ADD r4 r3 r1
SUB r3 r1 r5
LW r6 r3
SW r6 r4
Initializing pipeline...
Cycle IF ID
                                      EXEC
                                                       MEM
Ω
1
       ADD r1 r2 r3
2
      SUB r2 r3 r1 ADD r1 r2 r3 *
3
     ADD r4 r3 r1 SUB r2 r3 r1 ADD r1 r2 r3
                       SUB r2 r3 r1 *
SUB r2 r3 r1 *
      ADD r4 r3 r1
ADD r4 r3 r1
4
                                                       ADD r1 r2 r3
                                                                      ADD r1 r2 r3
5
     SUB r3 r1 r5 ADD r4 r3 r1 SUB r2 r3 r1 *
     LW r6 r3
SW r6 r4
                       SUB r3 r1 r5 ADD r4 r3 r1 SUB r2 r3 r1 LW r6 r3 SUB r3 r1 r5 ADD r4 r3 r1
7
8
                                                                      SUB r2 r3 r1
     SW r6 r4
                       LW r6 r3
                                                       SUB r3 r1 r5 ADD r4 r3 r1
10
    SW r6 r4
                       LW r6 r3
                                                                      SUB r3 r1 r5
11
                       SW r6 r4
                                       LW r6 r3
12
                       SW r6 r4
                                                      LW r6 r3
13
                       SW r6 r4
                                                                      LW r6 r3
14
                                       SW r6 r4
15
                                                       SW r6 r4
16
                                                                      SW r6 r4
17
Completed in 16 cycles.
Starting...
Forwarding is enabled with window size set to 1.
Loading application...instruction3.txt
Read file completed!!
Printing Application:
ADD r1 r2 r3
SUB r2 r3 r1
OR r4 r3 r1
AND r3 r1 r5
LW r6 r3
SW r6 r4
Initializing pipeline...
                                      EXEC
Cycle IF
             ID
                                                      MEM
                                                                      WB
       ADD r1 r2 r3
1
                      ADD r1 r2 r3
2
       SUB r2 r3 r1
       ADD r4 r3 r1 SUB r2 r3 r1 ADD r1 r2 r3
3

      SUB r3 r1 r5
      ADD r4 r3 r1
      SUB r2 r3 r1
      ADD r1 r2 r3

      SUB r3 r1 r5
      ADD r4 r3 r1
      *
      SUB r2 r3 r1

4
5
                                                                      ADD r1 r2 r3
                       SUB r3 r1 r5 ADD r4 r3 r1
      LW r6 r3
6
                                                                      SUB r2 r3 r1
                       LW r6 r3
7
     SW r6 r4
                                     SUB r3 r1 r5 ADD r4 r3 r1
8
                       SW r6 r4
                                       LW r6 r3
                                                       SUB r3 r1 r5
                                                                      ADD r4 r3 r1
9
                                       SW r6 r4
                                                      LW r6 r3
                                                                      SUB r3 r1 r5
10
                                                                      LW r6 r3
                                                       SW r6 r4
                                                                      SW r6 r4
11
12
Completed in 11 cycles.
```

Starting...

Forwarding is enabled with window size set to 2.

```
Loading application...instruction3.txt
Read file completed!!
Printing Application:
ADD r1 r2 r3
SUB r2 r3 r1
OR r4 r3 r1
AND r3 r1 r5
LW r6 r3
SW r6 r4
Initializing pipeline...
            ID
                                   EXEC
                                                 MEM
                                                               WB
Cycle IF
0
      ADD r1 r2 r3
      SUB r2 r3 r1 ADD r1 r2 r3
2.
      ADD r4 r3 r1 SUB r2 r3 r1 ADD r1 r2 r3
3
                                   SUB r2 r3 r1
      SUB r3 r1 r5 ADD r4 r3 r1
4
                                                 ADD r1 r2 r3
                                   ADD r4 r3 r1
      LW r6 r3
                                                 SUB r2 r3 r1
                                                               ADD r1 r2 r3
                     SUB r3 r1 r5
                    LW r6 r3
     SW r6 r4
                                   SUB r3 r1 r5
                                                 ADD r4 r3 r1
                                                              SUB r2 r3 r1
                                  LW r6 r3
                    SW r6 r4
                                                 SUB r3 r1 r5 ADD r4 r3 r1
7
8
                                   SW r6 r4
                                                 LW r6 r3
                                                               SUB r3 r1 r5
                                                               LW r6 r3
9
                                                 SW r6 r4
10
                                                               SW r6 r4
11
Completed in 10 cycles.
```