Vấn đề 6

Thành viên:

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Công thức tính thời gian chạy của chương trình:

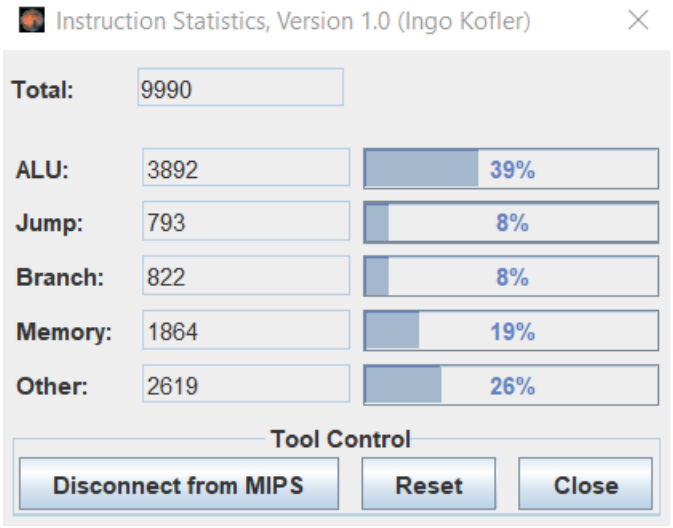
CPU time = (IC * CPI) / Clock rate

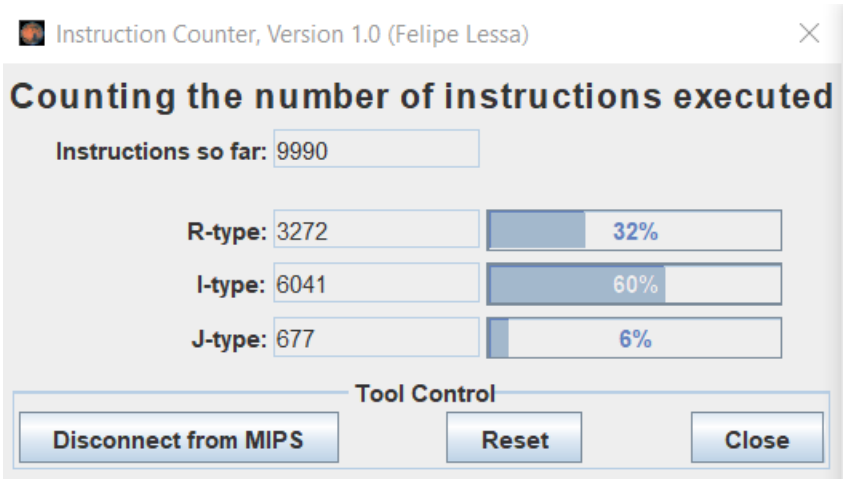
CPI =1

Clock rate = 2GHz

testcase1:

48,99,10,68,36,46,93,38,67,61,22,16,26,7,72,78,65,2,90,55





Output:

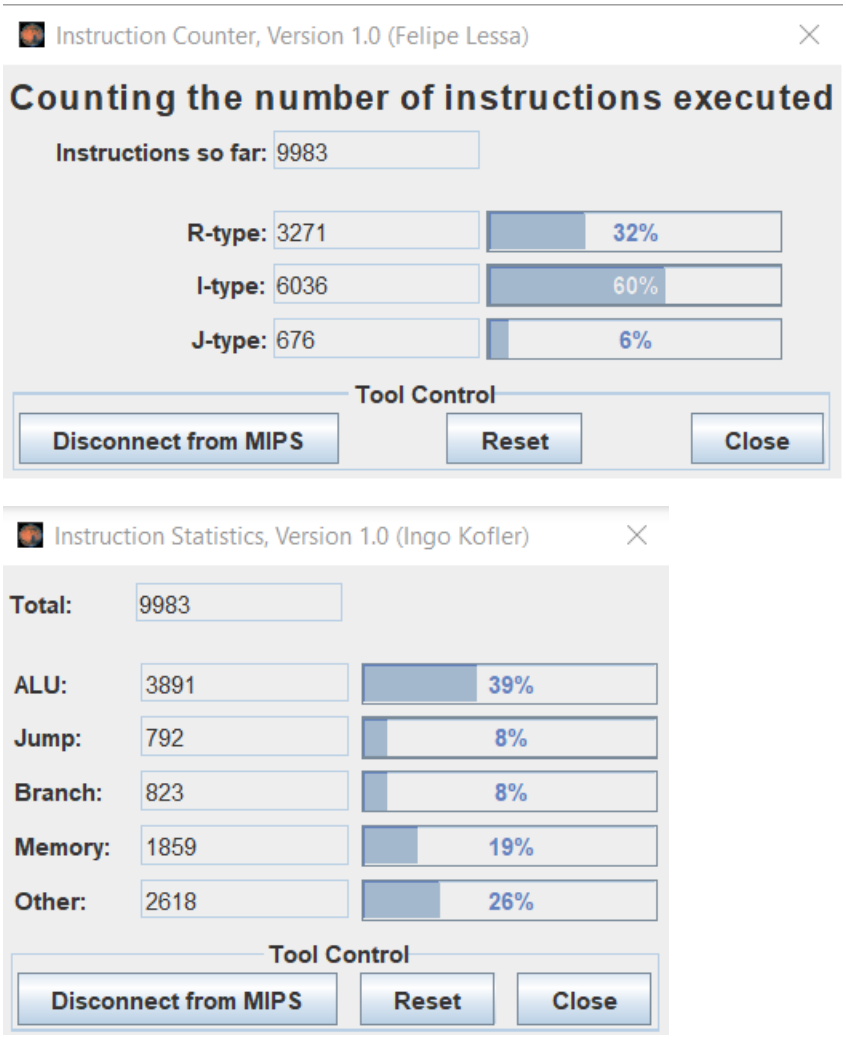
```
48 99 10 68 36 46 93 38 67 61 22 16 26 7 72 78 65 2 90 55
48 99 10 68 36 46 93 38 67 61 22 16 26 7 72 78 65 2 90 55
48 99 10 36 68 46 93 38 67 61 22 16 26 7 72 78 65 2 90 55
48 99 10 36 68 46 93 38 67 61 22 16 26 7 72 78 65 2 90 55
10 36 48 68 99 46 93 38 67 61 22 16 26 7 72 78 65 2 90 55
10 36 48 68 99 46 93 38 67 61 22 16 26 7 72 78 65 2 90 55
10 36 48 68 99 46 93 38 61 67 22 16 26 7 72 78 65 2 90 55
10 36 48 68 99 46 93 38 61 67 22 16 26 7 72 78 65 2 90 55
10 36 48 68 99 38 46 61 67 93 22 16 26 7 72 78 65 2 90 55
10 36 38 46 48 61 67 68 93 99 22 16 26 7 72 78 65 2 90 55
10 36 38 46 48 61 67 68 93 99 16 22 26 7 72 78 65 2 90 55
10 36 38 46 48 61 67 68 93 99 16 22 26 7 72 78 65 2 90 55
10 36 38 46 48 61 67 68 93 99 16 22 7 26 72 78 65 2 90 55
10 36 38 46 48 61 67 68 93 99 7 16 22 26 72 78 65 2 90 55
10 36 38 46 48 61 67 68 93 99 7 16 22 26 72 65 78 2 90 55
10 36 38 46 48 61 67 68 93 99 7 16 22 26 72 65 78 2 55 90
10 36 38 46 48 61 67 68 93 99 7 16 22 26 72 65 78 2 55 90
10 36 38 46 48 61 67 68 93 99 7 16 22 26 72 2 55 65 78 90
10 36 38 46 48 61 67 68 93 99 2 7 16 22 26 55 65 72 78 90
2 7 10 16 22 26 36 38 46 48 55 61 65 67 68 72 78 90 93 99

-- program is finished running --
```

CPU time = (IC * CPI) / Clock rate

= (9990*1)/(2*10^9) = 4.995*10^(-6) (giây)

Testcase2:

13,7,3,2,16,15,14,17,1,12,11,8,4,19,0,6,5,18,10,9



Output:

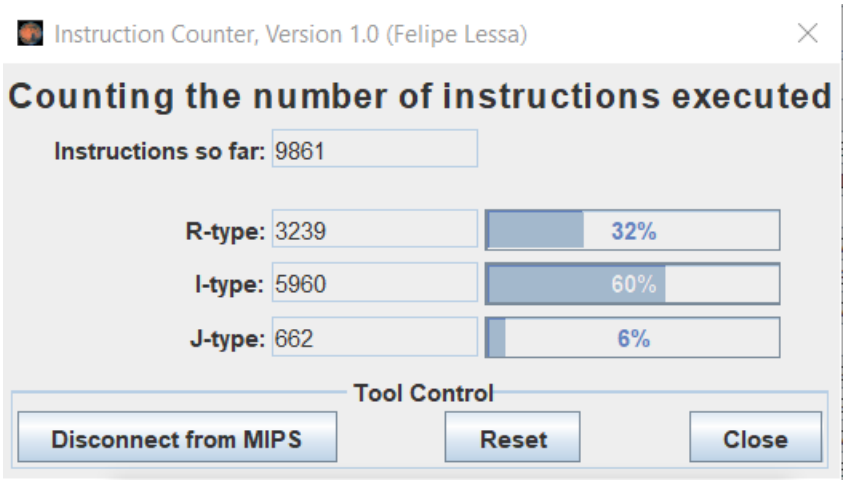
```
13 7 3 2 16 15 14 17 1 12 11 8 4 19 0 6 5 18 10 9
7 13 3 2 16 15 14 17 1 12 11 8 4 19 0 6 5 18 10 9
7 13 3 2 16 15 14 17 1 12 11 8 4 19 0 6 5 18 10 9
7 13 2 3 16 15 14 17 1 12 11 8 4 19 0 6 5 18 10 9
2 3 7 13 16 15 14 17 1 12 11 8 4 19 0 6 5 18 10 9
2 3 7 13 16 14 15 17 1 12 11 8 4 19 0 6 5 18 10 9
2 3 7 13 16 14 15 17 1 12 11 8 4 19 0 6 5 18 10 9
2 3 7 13 16 14 15 1 12 17 11 8 4 19 0 6 5 18 10 9
2 3 7 13 16 1 12 14 15 17 11 8 4 19 0 6 5 18 10 9
1 2 3 7 12 13 14 15 16 17 11 8 4 19 0 6 5 18 10 9
1 2 3 7 12 13 14 15 16 17 8 11 4 19 0 6 5 18 10 9
1 2 3 7 12 13 14 15 16 17 8 11 4 0 19 6 5 18 10 9
1 2 3 7 12 13 14 15 16 17 8 11 0 4 19 6 5 18 10 9
1 2 3 7 12 13 14 15 16 17 0 4 8 11 19 6 5 18 10 9
1 2 3 7 12 13 14 15 16 17 0 4 8 11 19 5 6 18 10 9
1 2 3 7 12 13 14 15 16 17 0 4 8 11 19 5 6 18 9 10
1 2 3 7 12 13 14 15 16 17 0 4 8 11 19 5 6 9 10 18
1 2 3 7 12 13 14 15 16 17 0 4 8 11 19 5 6 9 10 18
1 2 3 7 12 13 14 15 16 17 0 4 5 6 8 9 10 11 18 19
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

-- program is finished running --
```

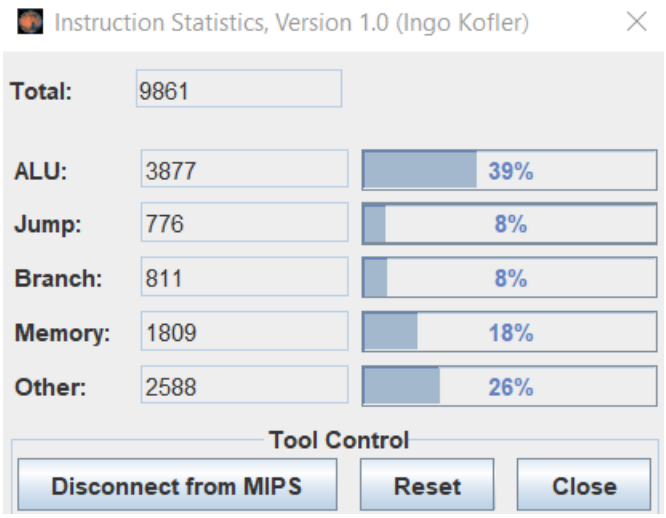
CPU time = (IC * CPI) / Clock rate

= (9983*1)/(2*10^9) = 4.9915*10^(-6) (giây)

Testcase3:

34,61,23,1,48,5,42,53,4,66,87,26,96,31,3,19,68,93,46,18





Output:

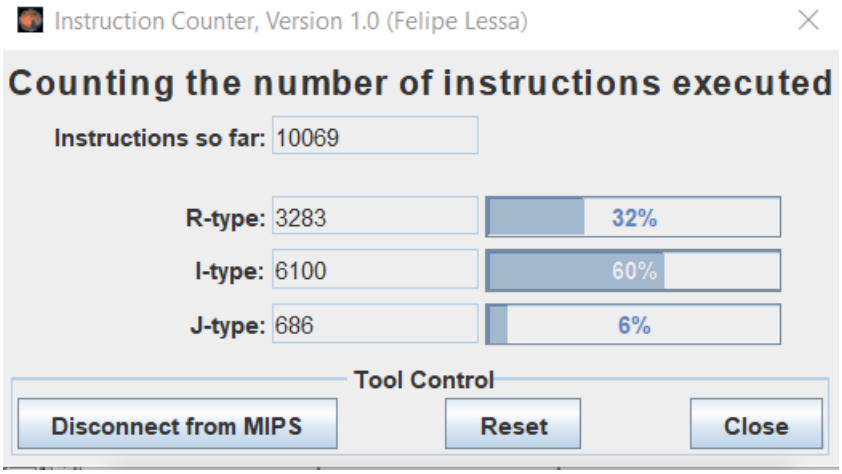
```
34 61 23 1 48 5 42 53 4 66 87 26 96 31 3 19 68 93 46 18
34 61 23 1 48 5 42 53 4 66 87 26 96 31 3 19 68 93 46 18
34 61 23 1 48 5 42 53 4 66 87 26 96 31 3 19 68 93 46 18
34 61 1 23 48 5 42 53 4 66 87 26 96 31 3 19 68 93 46 18
1 23 34 48 61 5 42 53 4 66 87 26 96 31 3 19 68 93 46 18
1 23 34 48 61 5 42 53 4 66 87 26 96 31 3 19 68 93 46 18
1 23 34 48 61 5 42 53 4 66 87 26 96 31 3 19 68 93 46 18
1 23 34 48 61 5 42 4 53 66 87 26 96 31 3 19 68 93 46 18
1 23 34 48 61 4 5 42 53 66 87 26 96 31 3 19 68 93 46 18
1 4 5 23 34 42 48 53 61 66 87 26 96 31 3 19 68 93 46 18
1 4 5 23 34 42 48 53 61 66 26 87 96 31 3 19 68 93 46 18
1 4 5 23 34 42 48 53 61 66 26 87 96 3 31 19 68 93 46 18
1 4 5 23 34 42 48 53 61 66 26 87 3 31 96 19 68 93 46 18
1 4 5 23 34 42 48 53 61 66 3 26 31 87 96 19 68 93 46 18
1 4 5 23 34 42 48 53 61 66 3 26 31 87 96 19 68 93 46 18
1 4 5 23 34 42 48 53 61 66 3 26 31 87 96 19 68 93 18 46
1 4 5 23 34 42 48 53 61 66 3 26 31 87 96 19 68 18 46 93
1 4 5 23 34 42 48 53 61 66 3 26 31 87 96 18 19 46 68 93
1 4 5 23 34 42 48 53 61 66 3 18 19 26 31 46 68 87 93 96
1 3 4 5 18 19 23 26 31 34 42 46 48 53 61 66 68 87 93 96

-- program is finished running --
```

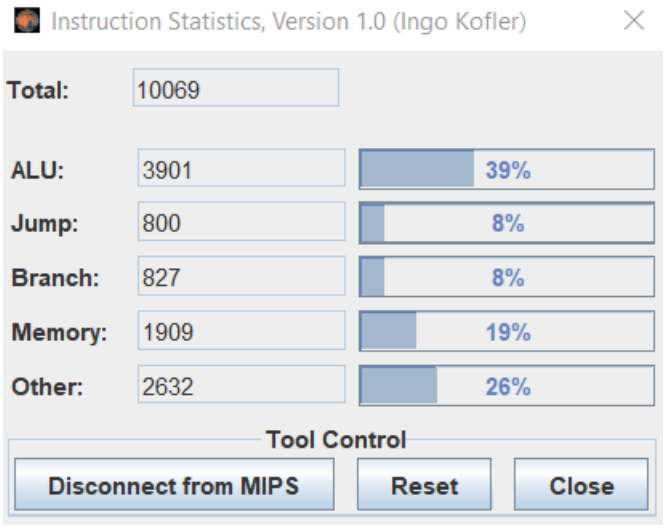
CPU time = (IC * CPI) / Clock rate

= (9861*1)/(2*10^9) = 4.9305*10^(-6) (giây)

Testcase4:

42,87,90,24,86,81,68,85,0,83,92,94,61,98,57,9,82,8,19,50





Output:

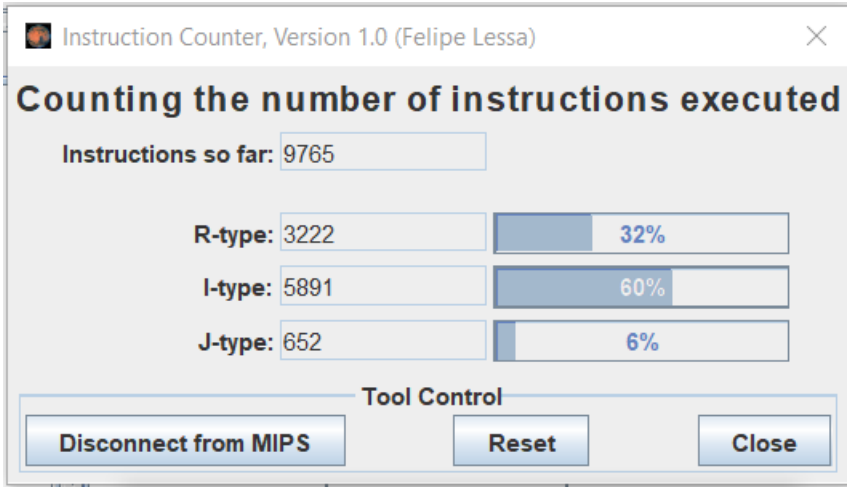
```
42 87 90 24 86 81 68 85 0 83 92 94 61 98 57 9 82 8 19 50
42 87 90 24 86 81 68 85 0 83 92 94 61 98 57 9 82 8 19 50
42 87 90 24 86 81 68 85 0 83 92 94 61 98 57 9 82 8 19 50
42 87 24 86 90 81 68 85 0 83 92 94 61 98 57 9 82 8 19 50
24 42 86 87 90 81 68 85 0 83 92 94 61 98 57 9 82 8 19 50
24 42 86 87 90 68 81 85 0 83 92 94 61 98 57 9 82 8 19 50
24 42 86 87 90 68 81 85 0 83 92 94 61 98 57 9 82 8 19 50
24 42 86 87 90 68 81 0 83 85 92 94 61 98 57 9 82 8 19 50
24 42 86 87 90 0 68 81 83 85 92 94 61 98 57 9 82 8 19 50
0 24 42 68 81 83 85 86 87 90 92 94 61 98 57 9 82 8 19 50
0 24 42 68 81 83 85 86 87 90 92 94 61 98 57 9 82 8 19 50
0 24 42 68 81 83 85 86 87 90 92 94 61 57 98 9 82 8 19 50
0 24 42 68 81 83 85 86 87 90 92 94 57 61 98 9 82 8 19 50
0 24 42 68 81 83 85 86 87 90 57 61 92 94 98 9 82 8 19 50
0 24 42 68 81 83 85 86 87 90 57 61 92 94 98 9 82 8 19 50
0 24 42 68 81 83 85 86 87 90 57 61 92 94 98 9 82 8 19 50
0 24 42 68 81 83 85 86 87 90 57 61 92 94 98 9 82 8 19 50
0 24 42 68 81 83 85 86 87 90 57 61 92 94 98 8 9 19 50 82
0 24 42 68 81 83 85 86 87 90 8 9 19 50 57 61 82 92 94 98
0 8 9 19 24 42 50 57 61 68 81 82 83 85 86 87 90 92 94 98

-- program is finished running --
```

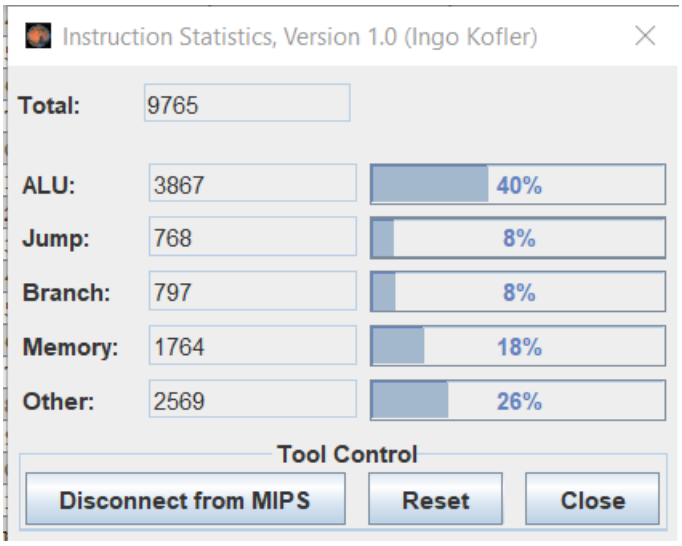
CPU time = (IC * CPI) / Clock rate

= (10069*1)/(2*10^9) = 5.0345*10^(-6) (giây)

Testcase5:

1,60,75,39,50,73,62,58,66,44,95,68,71,7,96,51,64,93,82,40





Output:

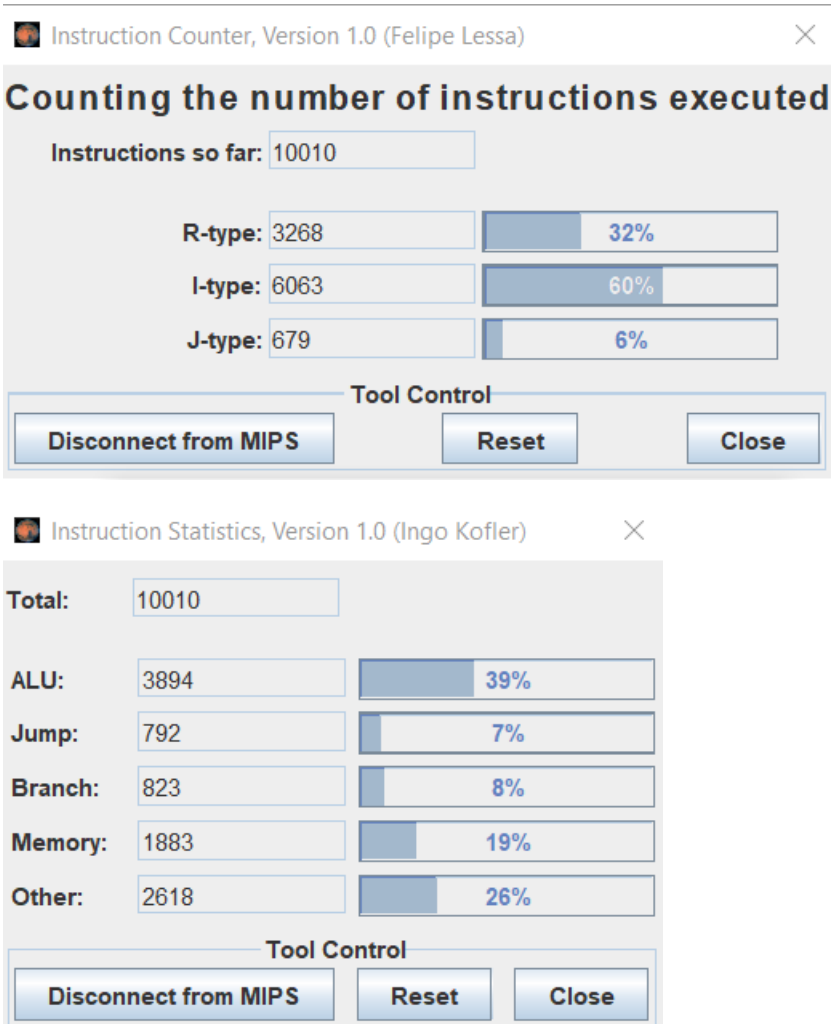
```
1 60 75 39 50 73 62 58 66 44 95 68 71 7 96 51 64 93 82 40
1 60 75 39 50 73 62 58 66 44 95 68 71 7 96 51 64 93 82 40
1 60 75 39 50 73 62 58 66 44 95 68 71 7 96 51 64 93 82 40
1 60 39 50 75 73 62 58 66 44 95 68 71 7 96 51 64 93 82 40
1 39 50 60 75 73 62 58 66 44 95 68 71 7 96 51 64 93 82 40
1 39 50 60 75 62 73 58 66 44 95 68 71 7 96 51 64 93 82 40
1 39 50 60 75 62 73 58 44 66 95 68 71 7 96 51 64 93 82 40
1 39 50 60 75 62 73 44 58 66 95 68 71 7 96 51 64 93 82 40
1 39 50 60 75 44 58 62 66 73 95 68 71 7 96 51 64 93 82 40
1 39 44 50 58 60 62 66 73 75 95 68 71 7 96 51 64 93 82 40
1 39 44 50 58 60 62 66 73 75 68 95 71 7 96 51 64 93 82 40
1 39 44 50 58 60 62 66 73 75 68 95 71 7 96 51 64 93 82 40
1 39 44 50 58 60 62 66 73 75 68 95 7 71 96 51 64 93 82 40
1 39 44 50 58 60 62 66 73 75 7 68 71 95 96 51 64 93 82 40
1 39 44 50 58 60 62 66 73 75 7 68 71 95 96 51 64 93 82 40
1 39 44 50 58 60 62 66 73 75 7 68 71 95 96 51 64 93 40 82
1 39 44 50 58 60 62 66 73 75 7 68 71 95 96 51 64 40 82 93
1 39 44 50 58 60 62 66 73 75 7 68 71 95 96 40 51 64 82 93
1 39 44 50 58 60 62 66 73 75 7 40 51 64 68 71 82 93 95 96
1 7 39 40 44 50 51 58 60 62 64 66 68 71 73 75 82 93 95 96

-- program is finished running --
```

CPU time = (IC * CPI) / Clock rate

= (9765*1)/(2*10^9) = 4.8825*10^(-6) (giây)

Testcase6:

25,94,9,27,99,57,85,47,29,80,23,61,92,3,78,18,38,46,70,21



Output:

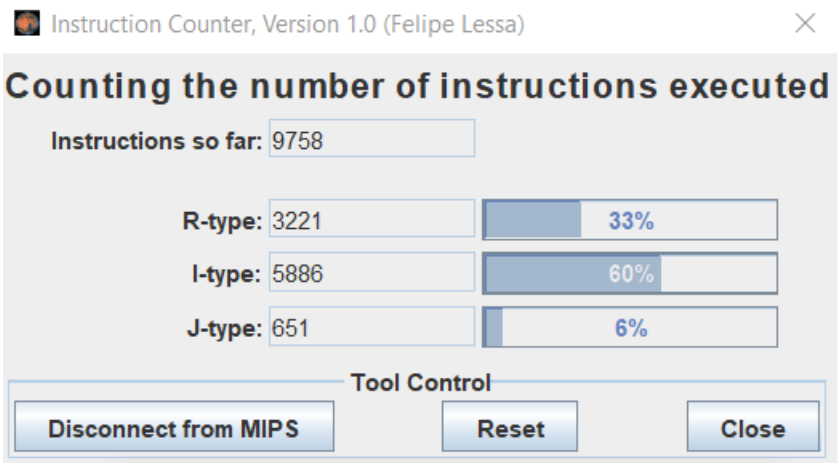
```
25 94 9 27 99 57 85 47 29 80 23 61 92 3 78 18 38 46 70 21
25 94 9 27 99 57 85 47 29 80 23 61 92 3 78 18 38 46 70 21
25 94 9 27 99 57 85 47 29 80 23 61 92 3 78 18 38 46 70 21
25 94 9 27 99 57 85 47 29 80 23 61 92 3 78 18 38 46 70 21
9 25 27 94 99 57 85 47 29 80 23 61 92 3 78 18 38 46 70 21
9 25 27 94 99 57 85 47 29 80 23 61 92 3 78 18 38 46 70 21
9 25 27 94 99 57 85 47 29 80 23 61 92 3 78 18 38 46 70 21
9 25 27 94 99 57 85 29 47 80 23 61 92 3 78 18 38 46 70 21
9 25 27 94 99 29 47 57 80 85 23 61 92 3 78 18 38 46 70 21
9 25 27 29 47 57 80 85 94 99 23 61 92 3 78 18 38 46 70 21
9 25 27 29 47 57 80 85 94 99 23 61 92 3 78 18 38 46 70 21
9 25 27 29 47 57 80 85 94 99 23 61 92 3 78 18 38 46 70 21
9 25 27 29 47 57 80 85 94 99 23 61 3 78 92 18 38 46 70 21
9 25 27 29 47 57 80 85 94 99 3 23 61 78 92 18 38 46 70 21
9 25 27 29 47 57 80 85 94 99 3 23 61 78 92 18 38 46 70 21
9 25 27 29 47 57 80 85 94 99 3 23 61 78 92 18 38 46 21 70
9 25 27 29 47 57 80 85 94 99 3 23 61 78 92 18 38 21 46 70
9 25 27 29 47 57 80 85 94 99 3 23 61 78 92 18 21 38 46 70
9 25 27 29 47 57 80 85 94 99 3 18 21 23 38 46 61 70 78 92
3 9 18 21 23 25 27 29 38 46 47 57 61 70 78 80 85 92 94 99

-- program is finished running --
```

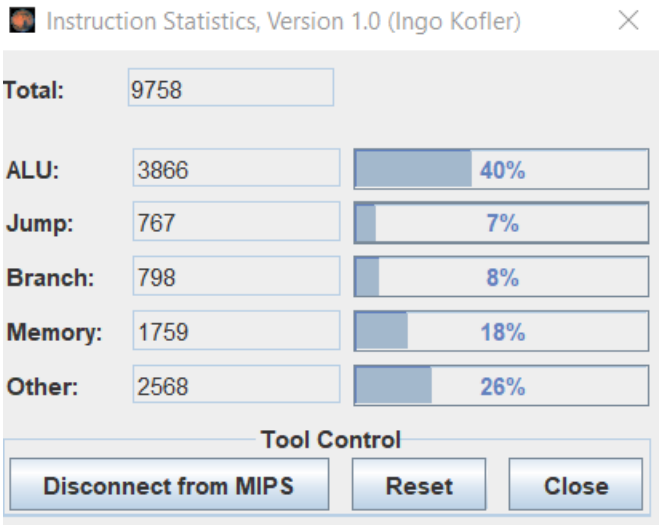
CPU time = (IC * CPI) / Clock rate

= (10010*1)/(2*10^9) = 5.005 *10^(-6) (giây)

Testcase 7:

77,29,33,54,41,74,16,20,21,53,92,67,73,78,79,14,45,57,59,85





Output:

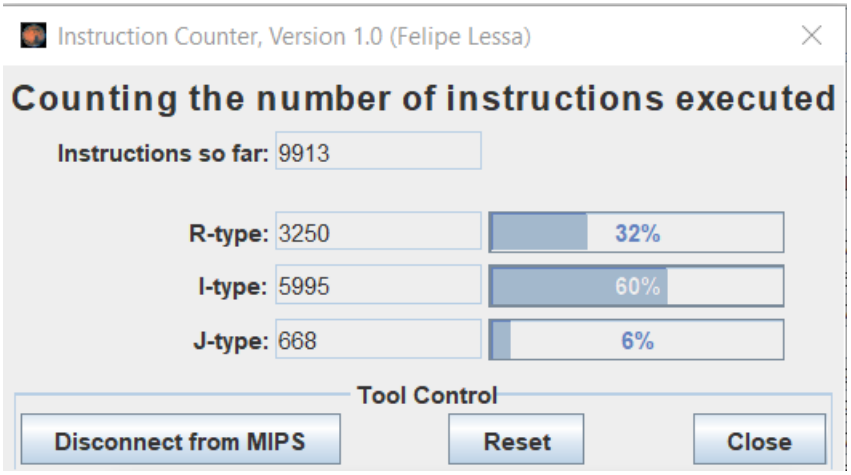
```
77 29 33 54 41 74 16 20 21 53 92 67 73 78 79 14 45 57 59 85
29 77 33 54 41 74 16 20 21 53 92 67 73 78 79 14 45 57 59 85
29 77 33 41 54 74 16 20 21 53 92 67 73 78 79 14 45 57 59 85
29 77 33 41 54 74 16 20 21 53 92 67 73 78 79 14 45 57 59 85
29 33 41 54 77 74 16 20 21 53 92 67 73 78 79 14 45 57 59 85
29 33 41 54 77 16 74 20 21 53 92 67 73 78 79 14 45 57 59 85
29 33 41 54 77 16 74 20 21 53 92 67 73 78 79 14 45 57 59 85
29 33 41 54 77 16 74 20 21 53 92 67 73 78 79 14 45 57 59 85
29 33 41 54 77 16 20 21 53 74 92 67 73 78 79 14 45 57 59 85
16 20 21 29 33 41 53 54 74 77 92 67 73 78 79 14 45 57 59 85
16 20 21 29 33 41 53 54 74 77 67 92 73 78 79 14 45 57 59 85
16 20 21 29 33 41 53 54 74 77 67 92 73 78 79 14 45 57 59 85
16 20 21 29 33 41 53 54 74 77 67 92 73 78 79 14 45 57 59 85
16 20 21 29 33 41 53 54 74 77 67 73 78 79 92 14 45 57 59 85
16 20 21 29 33 41 53 54 74 77 67 73 78 79 92 14 45 57 59 85
16 20 21 29 33 41 53 54 74 77 67 73 78 79 92 14 45 57 59 85
16 20 21 29 33 41 53 54 74 77 67 73 78 79 92 14 45 57 59 85
16 20 21 29 33 41 53 54 74 77 67 73 78 79 92 14 45 57 59 85
16 20 21 29 33 41 53 54 74 77 14 45 57 59 67 73 78 79 85 92
14 16 20 21 29 33 41 45 53 54 57 59 67 73 74 77 78 79 85 92

-- program is finished running --
```

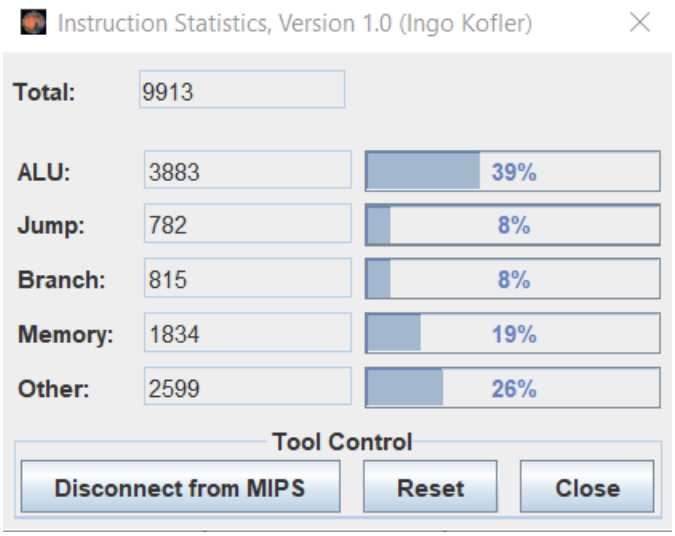
CPU time = (IC * CPI) / Clock rate

= (9758*1)/(2*10^9) = 4.879*10^(-6) (giây)

Testcase8:

78,90,96,70,71,0,24,30,86,41,76,36,72,6,99,67,88,89,83,63





Output:

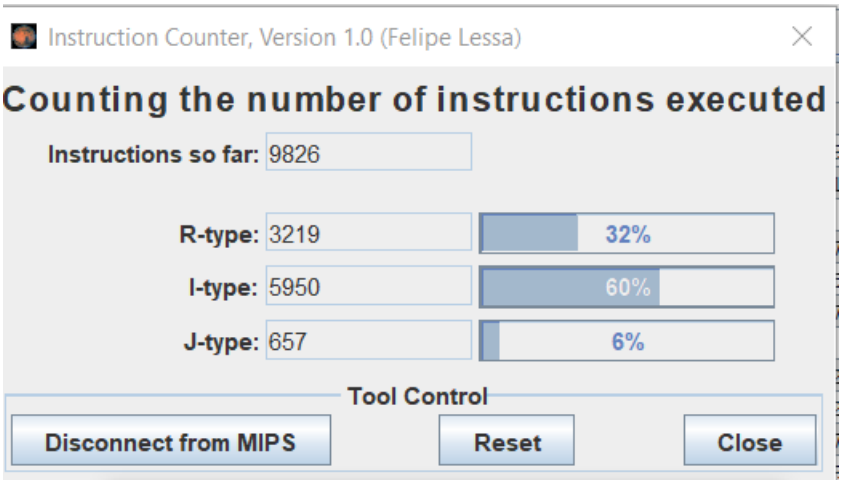
```
78 90 96 70 71 0 24 30 86 41 76 36 72 6 99 67 88 89 83 63
78 90 96 70 71 0 24 30 86 41 76 36 72 6 99 67 88 89 83 63
78 90 96 70 71 0 24 30 86 41 76 36 72 6 99 67 88 89 83 63
78 90 70 71 96 0 24 30 86 41 76 36 72 6 99 67 88 89 83 63
70 71 78 90 96 0 24 30 86 41 76 36 72 6 99 67 88 89 83 63
70 71 78 90 96 0 24 30 86 41 76 36 72 6 99 67 88 89 83 63
70 71 78 90 96 0 24 30 41 86 76 36 72 6 99 67 88 89 83 63
70 71 78 90 96 0 24 30 41 86 76 36 72 6 99 67 88 89 83 63
70 71 78 90 96 0 24 30 41 86 76 36 72 6 99 67 88 89 83 63
0 24 30 41 70 71 78 86 90 96 76 36 72 6 99 67 88 89 83 63
0 24 30 41 70 71 78 86 90 96 36 76 72 6 99 67 88 89 83 63
0 24 30 41 70 71 78 86 90 96 36 76 72 6 99 67 88 89 83 63
0 24 30 41 70 71 78 86 90 96 36 76 6 72 99 67 88 89 83 63
0 24 30 41 70 71 78 86 90 96 6 36 72 76 99 67 88 89 83 63
0 24 30 41 70 71 78 86 90 96 6 36 72 76 99 67 88 89 83 63
0 24 30 41 70 71 78 86 90 96 6 36 72 76 99 67 88 89 63 83
0 24 30 41 70 71 78 86 90 96 6 36 72 76 99 67 88 63 83 89
0 24 30 41 70 71 78 86 90 96 6 36 72 76 99 63 67 83 88 89
0 24 30 41 70 71 78 86 90 96 6 36 63 67 72 76 83 88 89 99
0 6 24 30 36 41 63 67 70 71 72 76 78 83 86 88 89 90 96 99

-- program is finished running --
```

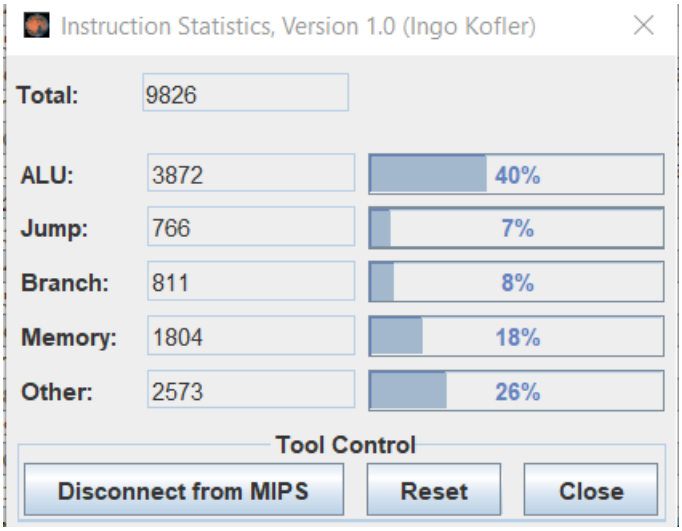
CPU time = (IC * CPI) / Clock rate

= (9913*1)/(2*10^9) = 4.9565*10^(-6) (giây)

Testcase9:

42,43,13,18,55,25,79,75,94,46,0,32,2,47,69,15,96,29,52,73





Output:

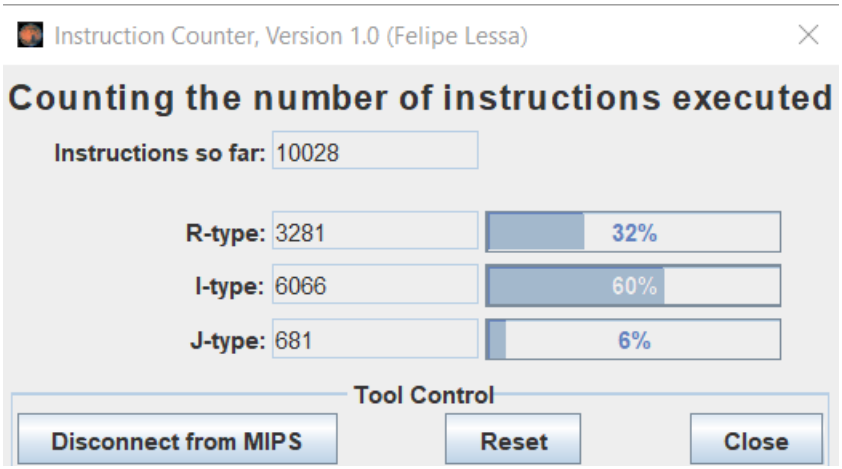
```
42 43 13 18 55 25 79 75 94 46 0 32 2 47 69 15 96 29 52 73
42 43 13 18 55 25 79 75 94 46 0 32 2 47 69 15 96 29 52 73
42 43 13 18 55 25 79 75 94 46 0 32 2 47 69 15 96 29 52 73
42 43 13 18 55 25 79 75 94 46 0 32 2 47 69 15 96 29 52 73
13 18 42 43 55 25 79 75 94 46 0 32 2 47 69 15 96 29 52 73
13 18 42 43 55 25 79 75 94 46 0 32 2 47 69 15 96 29 52 73
13 18 42 43 55 25 79 75 46 94 0 32 2 47 69 15 96 29 52 73
13 18 42 43 55 25 79 46 75 94 0 32 2 47 69 15 96 29 52 73
13 18 42 43 55 25 46 75 79 94 0 32 2 47 69 15 96 29 52 73
13 18 25 42 43 46 55 75 79 94 0 32 2 47 69 15 96 29 52 73
13 18 25 42 43 46 55 75 79 94 0 32 2 47 69 15 96 29 52 73
13 18 25 42 43 46 55 75 79 94 0 32 2 47 69 15 96 29 52 73
13 18 25 42 43 46 55 75 79 94 0 32 2 47 69 15 96 29 52 73
13 18 25 42 43 46 55 75 79 94 0 2 32 47 69 15 96 29 52 73
13 18 25 42 43 46 55 75 79 94 0 2 32 47 69 15 96 29 52 73
13 18 25 42 43 46 55 75 79 94 0 2 32 47 69 15 96 29 52 73
13 18 25 42 43 46 55 75 79 94 0 2 32 47 69 15 96 29 52 73
13 18 25 42 43 46 55 75 79 94 0 2 32 47 69 15 29 52 73 96
13 18 25 42 43 46 55 75 79 94 0 2 15 29 32 47 52 69 73 96
0 2 13 15 18 25 29 32 42 43 46 47 52 55 69 73 75 79 94 96

-- program is finished running --
```

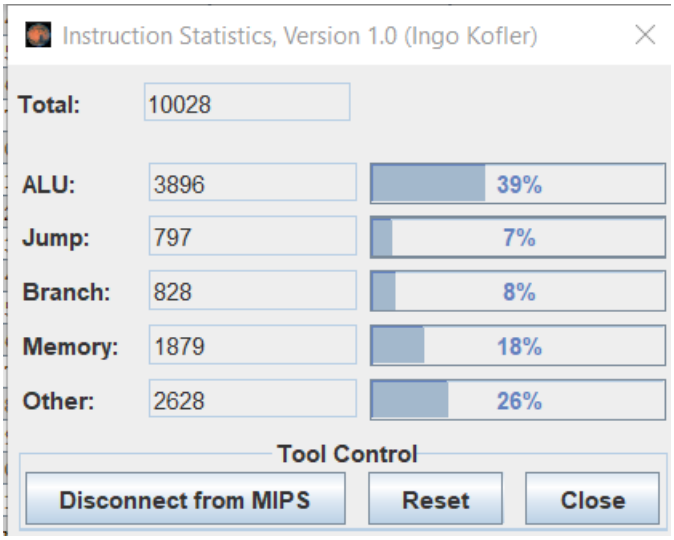
CPU time = (IC * CPI) / Clock rate

= (9826*1)/(2*10^9) = 4.913*10^(-6) (giây)

Testcase10:

34,1,76,61,67,75,74,87,30,53,47,56,82,52,55,66,58,8,18,59





```
34 1 76 61 67 75 74 87 30 53 47 56 82 52 55 66 58 8 18 59
1 34 76 61 67 75 74 87 30 53 47 56 82 52 55 66 58 8 18 59
1 34 76 61 67 75 74 87 30 53 47 56 82 52 55 66 58 8 18 59
1 34 61 67 76 75 74 87 30 53 47 56 82 52 55 66 58 8 18 59
1 34 61 67 76 75 74 87 30 53 47 56 82 52 55 66 58 8 18 59
1 34 61 67 76 74 75 87 30 53 47 56 82 52 55 66 58 8 18 59
1 34 61 67 76 74 75 87 30 53 47 56 82 52 55 66 58 8 18 59
1 34 61 67 76 74 75 30 53 87 47 56 82 52 55 66 58 8 18 59
1 34 61 67 76 30 53 74 75 87 47 56 82 52 55 66 58 8 18 59
1 30 34 53 61 67 74 75 76 87 47 56 82 52 55 66 58 8 18 59
1 30 34 53 61 67 74 75 76 87 47 56 82 52 55 66 58 8 18 59
1 30 34 53 61 67 74 75 76 87 47 56 82 52 55 66 58 8 18 59
1 30 34 53 61 67 74 75 76 87 47 56 52 55 82 66 58 8 18 59
1 30 34 53 61 67 74 75 76 87 47 52 55 56 82 66 58 8 18 59
1 30 34 53 61 67 74 75 76 87 47 52 55 56 82 58 66 8 18 59
1 30 34 53 61 67 74 75 76 87 47 52 55 56 82 58 66 8 18 59
1 30 34 53 61 67 74 75 76 87 47 52 55 56 82 58 66 8 18 59
1 30 34 53 61 67 74 75 76 87 47 52 55 56 82 8 18 58 59 66
1 30 34 53 61 67 74 75 76 87 8 18 47 52 55 56 58 59 66 82
1 8 18 30 34 47 52 53 55 56 58 59 61 66 67 74 75 76 82 87

-- program is finished running --
```

CPU time = (IC * CPI) / Clock rate

= (10028*1)/(2*10^9) = 5.014 *10^(-6) (giây)