Instr:

ADD, XOR, OR, LOD, STR, BEQ, SLL, SRL, AND, XXR,

CPP - copy to r1

CYY - cppy to r2

Reg:

$r0 - Mem (load/store)

$r1,$r2 - Opearnd for R-type instruction

$r3 - Load from immediate

$r4-$r15 - general use

----------------------------------------------------------------

1. LDI 10100000 //mem[160] = starting reading address
2. CPP $r3
3. LDI 00000000
4. CYY $r3
5. ORR $r0
6. LOD $r1 // r1 = x x x x x \_ 000 - 5 bits x pattern
7. LDI 00000011
8. CYY $r3
9. SRL $r12 //r12 = 000\_xxxxx - bits x pattern
10. LDI 10000000
11. CPP $r3 //mem[128] start of reading
12. LDI 00000000
13. CYY $r3
14. ORR $r0 //r0 = 128
15. LDI 00000000
16. CPP $r3
17. CYY $r3
18. ADD $r13
19. ADD $r14
20. ADD $r14

--------------------------LOOP-------------------------------

1. LOD $r4 //r4 = mem[128]
2. LDI 00011111 // first 5 bit
3. CPP $r3
4. CYY $r4
5. AND $r6 //r6 = {0,0,0, r4[4:0]}
6. LDI 00111110
7. CPP $r3
8. AND $r1
9. LDI 00000001
10. CYY $r3
11. SRL $r7 //r7= {0,0,0,r4[5:1]}
12. LDI 01111100
13. CPP $r3
14. CYY $r4
15. AND $r1
16. LDI 00000010
17. CYY $r3
18. SRL $r8 //r8={0,0,0,r4[6:2]}
19. LDI 11111000
20. CPP $r3
21. CYY $r4
22. AND $r1
23. LDI 00000011
24. CYY $r3
25. SRL $r9 //r9={0,0,0,r4[7:3]}
26. LDI 00000000
27. CPP $r3
28. AND $r11 // r11 is flag for occur in a byte
29. CPP $r6
30. CYY $r12
31. EQL $r1 // if r6 == pattern r1 = 1
32. CYY $r13 // Occurrence counter
33. ADD $r13 // r13 = r13 + r1
34. CYY $r11
35. ORR $r11 // r11 ever = 1 will stay 1
36. CPP $r7
37. CYY $r12
38. EQL $r1 // if r7 == pattern r1 = 1
39. CYY $r13 // Occurrence counter
40. ADD $13 // r13 = r13 + r1
41. CYY $r11
42. ORR $r11 // r11 ever = 1 will stay 1
43. CPP $r8
44. CYY $r12
45. EQL $r1 // if r8 == pattern r1 = 1
46. CYY $r13 // Occurrence counter
47. ADD $13 // r13 = r13 + r1
48. CYY $r11
49. ORR $r11 // r11 ever = 1 will stay 1
50. CPP $r9
51. CYY $r12
52. EQL $r1 // if r9 == pattern r1 = 1
53. CYY $r13 // Occurrence counter
54. ADD $r13 // r13 = r13 + r1
55. CYY $r11
56. ORR $r11 // r11 ever = 1 will stay 1
57. CPP $r14
58. CYY $r11
59. ADD $r14
60. LDI 00010100 // start loop - 20
61. CPP $r3
62. LDI 00000000
63. CYY $r3
64. ADD $r6 //r6 = 14
65. LDI 00000001
66. CPP $r3
67. CYY $r0
68. ADD $r0 //r0++
69. LDI 10100000 // 160 end of read
70. CPP $r3
71. CYY $r0
72. BNE $r6 // r0 != 150 go to loop
73. LDI 11000000 // else str mem[192]
74. CPP $r3
75. LDI 00000000
76. CYY $r3
77. ADD $r0
78. STR $r13
79. LDI 00000001
80. CPP $r3
81. CYY $r0
82. ADD $r0
83. STR $r14

-----------------------------------LAST PART--------------------------

1. LDI 10000000
2. CPP $r3 //mem[128] start of reading
3. LDI 00000000
4. CYY $r3
5. ORR $r0 //r0 = 128

--------------------------------LOOP----------------------------------

1. LOD $r5 //r5 = mem[128]
2. LDI 00000001
3. CPP $r3
4. CYY $r0
5. ADD $r0 //r0= r0 + 1
6. LOD $r4 //r4=mem[129]
7. LDI 11110000
8. CPP $r3
9. CYY $r4
10. AND $r6 //r6 = a7 a6 a5 a4 0 0 0 0
11. LDI 00000100
12. CYY $r3
13. CPP $r6
14. SRL $r6 // r6 = 0 0 0 0 a7 a6 a5 a4
15. LDI 00001111
16. CPP $r3
17. CYY $r5
18. AND $r7 //r7 = 0 0 0 0 b3 b2 b1 b0
19. LDI 00000100
20. CYY $r3
21. CPP $r7
22. SLL $r1 //r7 = b3 b2 b1 b0 0 0 0 0
23. CYY $r6
24. ORR $r10 //r10 = b3 b2 b1 b0 a7 a6 a5 a4
25. LDI 00011111 // first 5 bit
26. CPP $r3
27. CYY $r10
28. AND $r6 //r6 = {0,0,0, r4[4:0]}
29. LDI 00111110
30. CPP $r3
31. AND $r1
32. LDI 00000001
33. CYY $r3
34. SRL $r7 //r7= {0,0,0,r4[5:1]}
35. LDI 01111100
36. CPP $r3
37. CYY $r10
38. AND $r1
39. LDI 00000010
40. CYY $r3
41. SRL $r8 //r8={0,0,0,r4[6:2]}
42. LDI 11111000
43. CPP $r3
44. CYY $r10
45. AND $r1
46. LDI 00000011
47. CYY $r3
48. SRL $r9 //r9={0,0,0,r4[7:3]}
49. CPP $r6
50. CYY $r12
51. EQL $r1 // if r6 == pattern r1 = 1
52. CYY $r15 // Occurrence counter
53. ADD $r15 // r13 = r13 + r1
54. CPP $r7
55. CYY $r12
56. EQL $r1 // if r7 == pattern r1 = 1
57. CYY $r15 // Occurrence counter
58. ADD $r15 // r13 = r13 + r1
59. CPP $r8
60. CYY $r12
61. EQL $r1 // if r8 == pattern r1 = 1
62. CYY $r15 // Occurrence counter
63. ADD $r15
64. CPP $r9
65. CYY $r12
66. EQL $r1 // if r9 == pattern r1 = 1
67. CYY $r15 // Occurrence counter
68. ADD $r15
69. LDI 01101100 // start loop - 108
70. CPP $r3
71. LDI 00000000
72. CYY $r3
73. ADD $r6 //r6 = 108
74. LDI 10011111 // 159 end of read
75. CPP $r3
76. CYY $r0
77. BNE $r6 // r0 != 159 go to loop
78. CPP $r13
79. CYY $r15
80. ADD $r15 //r15 =r13+r15
81. LDI 11000010 // 194
82. CPP $r3
83. LDI 00000000
84. CYY $r3
85. ORR $r0 //r0 = 194
86. STR $r15