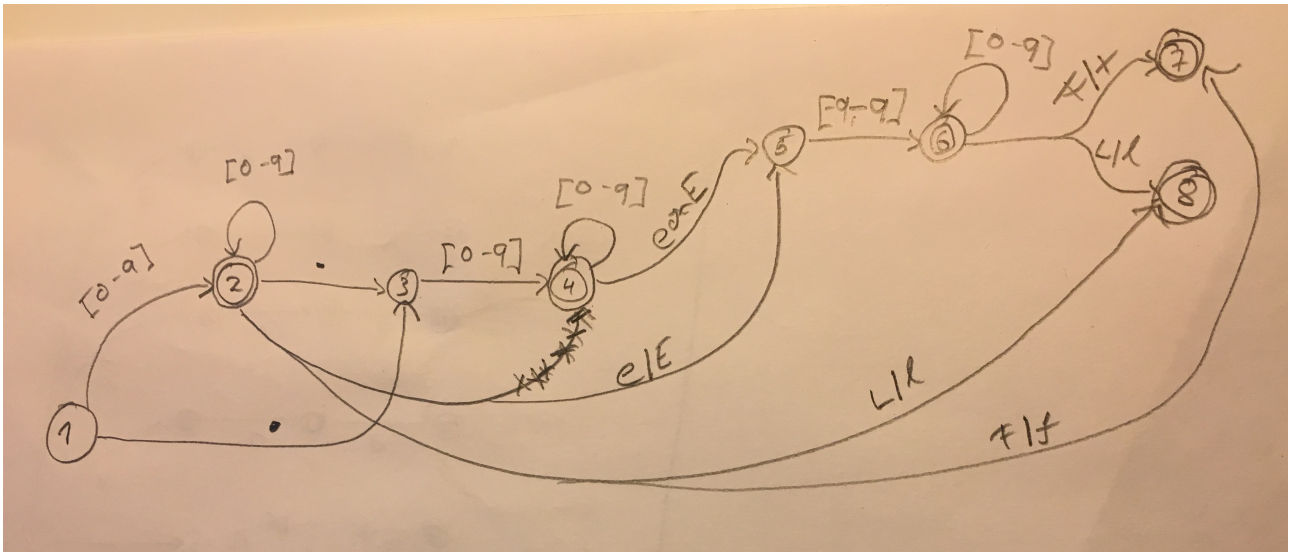
Problem set 1

TDT 4205 - Sigurd Strømsem

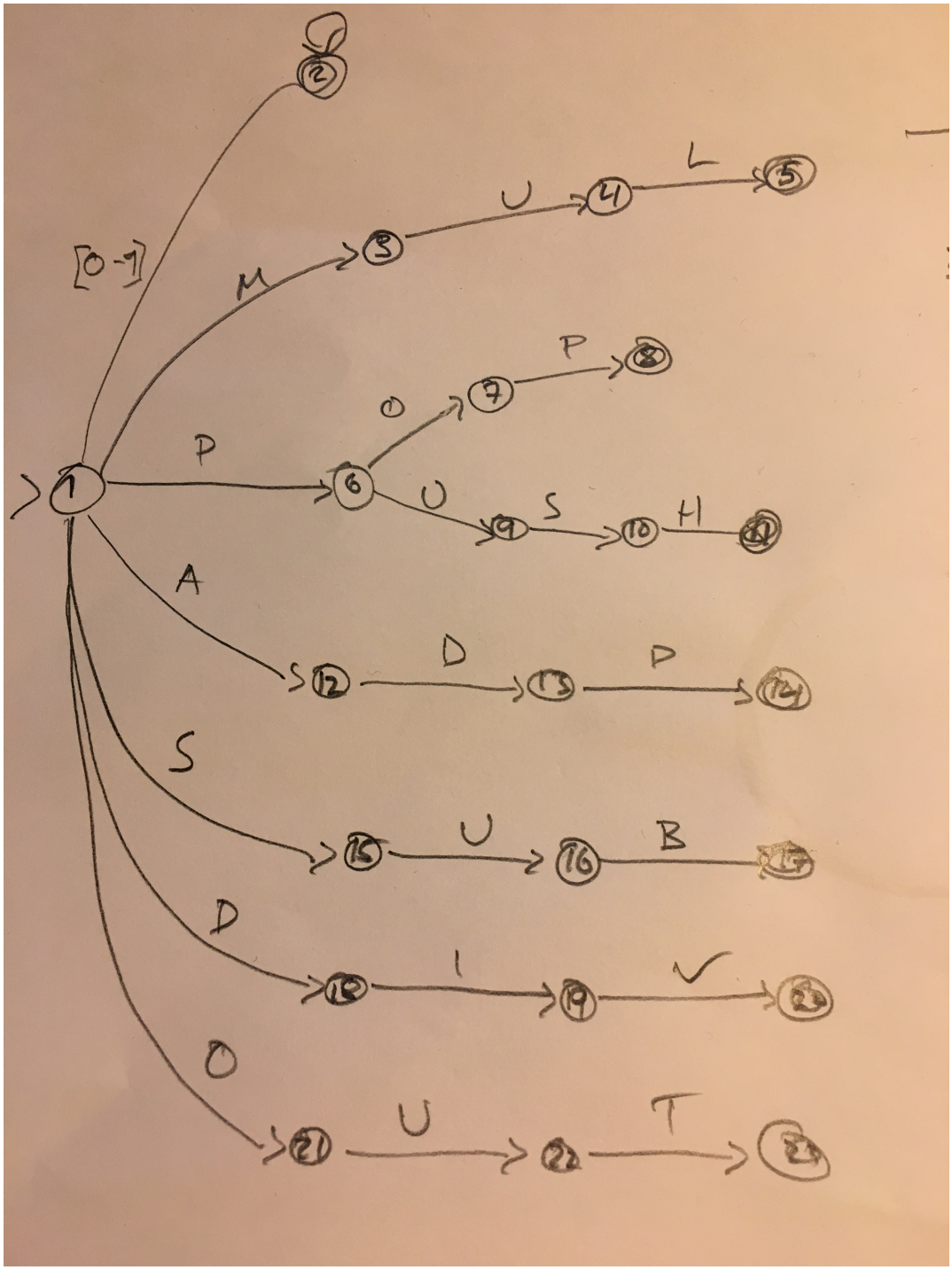
1.1 We know that all finite languages are regular. The set of valid modifier combinations in Java are finite, even though they can appear in any order, and thus a regular language.

1.2



The drawing is not perfect but illustrates how to extract a floating point constant

2.1



DFA for recognizing the regular expressions

2.2

Transtab

	[0-9]+	M	U	L	P	O	S	H	A	D	B	I	V	T
1	2	3	-	-	6	21	15	-	12	18	-	-	-	-
2	2	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	4	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	5	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	-	-	9	-	-	7	-	-	-	-	-	-	-	-
7	-	-	-	-	8	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	10	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	11	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	13	-	-	-	-
13	-	-	-	-	-	-	-	-	-	14	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	-	-	16	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	17	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	19	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-	20	-
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	22	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-	-	23
23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	0	1	2	3	4	5	6	7	8	9	10	11	12	13

State transition table. The blue state 1 is the starting state and the green ones are acceptance states. The numbers at the bottom are to be ignored (array indices).

2.3 See simplestack.c for implementation. Not a lot of assumptions were made, but the implementation has some room for improvement. There should be some sort of check to ensure that the integer input is not larger than 32-bit. The program could also be extended to give some error messages when it is close to an accepting state when processing the input (like “Did you mean PUSH?” when the input was PUSF). Right now the program terminates on erroneous input.