

Section 1: Regular Expressions

Regular Expression Reference Table

Symbol	Meaning	Example(s)
a	Literal character	a , any symbol in your alphabet Σ
ab	Concatenation of regex's (or literal characters) a and b	ab , $(abc)(def)$
ϵ	Empty string	ϵ
$a b$	a or b	a, b
a^*	0 or more a 's	$\epsilon, a, aaaa, aaaaa$
a^+	1 or more a 's	$a, aaa, aaaaa$
$a?$	0 or 1 a 's	ϵ, a
$[a-z]$	1 character in range $a-z$: ($a b \dots z$)	$a, b, c, d, e, f, \dots, z$
$[skj]$	1 of characters in bracket: ($s k j$)	s, k, j

1) Describe the meaning of each of the following regular expressions in English and give two different strings it can produce:

- i) $(1 | 0)^* 0$
- ii) $([A-Z][a-z]^* | [0-9]^+)$
- iii) $(\epsilon | 4?0+1^* X 3^+)$

2) Write a regular expression for each of the following specifications:

- i) All strings consisting of 0's and 1's (binary digits) with an even number of 0s
- ii) camelCased variable name in Java, where the alphabet is upper and lower-cased letters without any numbers or underscores
- iii) Non-empty binary strings where each 1 directly follows a 0 (challenge: only use symbols in table up until $*$)