1 Определение грамматики

1. $\Sigma = \{[a - zA - Z], ., \backslash, let, =, (,), \backslash n\}$
2. $N = \{application, definition, defname, term, lambda - abstraction, variable, input\}$
3. $S = input$
4. P :

   1) $< definition >::= let < defname >=< term >.$
   2) $< defname >::= A|B|...|Z\{a|b|...|z|A|B|...|Z\}.$
   3) $< term >::=< application > |(< term >)| < lambda - abstraction > | < variable > | < defname >$
   4) $< variable >::= a|b|...|z\{a|b|...|z|A|B|...|Z\}$
   5) $< lambda - abstraction >= \backslash < variable > \{< variable >\}. < term >$
   6) $< application >=< term >< term >$
   7) $< input >= \{< definition > \backslash n\} < term >.$

2 Пример

```
let S = \ x y z.x z (y z)
let K = \ x y.x
S K K
```

$$< input >\Rightarrow< definition > \backslash n\{< definition > \backslash n\} < term >\Rightarrow$$

Первое $definition$:

$$< definition > \Rightarrow \quad (1)$$
$$let < termname > = < term > \Rightarrow \quad (2)$$
$$let\ S = < term > \Rightarrow \quad (3)$$
$$let\ S = < lambda - abstraction > \Rightarrow \quad (4)$$
$$let\ S = \backslash < variable > \{< variable >\}. < term > \Rightarrow \quad (5)$$
$$let\ S = \backslash < variable >< variable >< variable > . < term > \Rightarrow \quad (6)$$
$$let\ S = \backslash x < variable >< variable > . < term > \Rightarrow \quad (7)$$
$$let\ S = \backslash xy < variable > . < term > \Rightarrow \quad (8)$$
$$let\ S = \backslash xyz. < term > \Rightarrow \quad (9)$$
$$let\ S = \backslash xyz. < application > \Rightarrow \quad (10)$$
$$let\ S = \backslash xyz. < term >< term > \Rightarrow \quad (11)$$
$$let\ S = \backslash xyz. < application >< term > \Rightarrow \quad (12)$$
$$let\ S = \backslash xyz. < term >< term >< term > \Rightarrow \quad (13)$$
$$let\ S = \backslash xyz. < variable >< term >< term > \Rightarrow \quad (14)$$
$$let\ S = \backslash xyz.x < term >< term > \Rightarrow \quad (15)$$
$$let\ S = \backslash xyz.x < variable >< term > \Rightarrow \quad (16)$$
$$let\ S = \backslash xyz.xz < term > \Rightarrow \quad (17)$$
$$let\ S = \backslash xyz.xz(< term >) \Rightarrow \quad (18)$$
$$let\ S = \backslash xyz.xz(< application >) \Rightarrow \quad (19)$$
$$let\ S = \backslash xyz.xz(< term >< term >) \Rightarrow \quad (20)$$
$$let\ S = \backslash xyz.xz(< variable >< term >) \Rightarrow \quad (21)$$
$$let\ S = \backslash xyz.xz(y < term >) \Rightarrow \quad (22)$$
$$let\ S = \backslash xyz.xz(yz) \Rightarrow \quad (23)$$

Итог:

```
let S = \ x y z.x z (y z)
```

Второе $definition$:

$$< definition >\Rightarrow \quad (24)$$
$$let < termname >=< term >\Rightarrow \quad (25)$$
$$let\ K =< term >\Rightarrow \quad (26)$$
$$let\ K =< lambda - abstraction >\Rightarrow \quad (27)$$
$$let\ K = \backslash < variable > \{< variable >\}. < term >\Rightarrow \quad (28)$$
$$let\ K = \backslash < variable >< variable > . < term >\Rightarrow \quad (29)$$
$$let\ K = \backslash x < variable > . < term >\Rightarrow \quad (30)$$
$$let\ K = \backslash xy. < term >\Rightarrow \quad (31)$$
$$let\ K = \backslash xyz. < variable >\Rightarrow \quad (32)$$
$$let\ K = \backslash xyz.x \Rightarrow \quad (33)$$

Итог:

```
let S = \ x y z.x z (y z)
let K = \ x y.x
```

$term$:

$$< term >\Rightarrow \quad (34)$$
$$< application >\Rightarrow \quad (35)$$
$$< term >< term >\Rightarrow \quad (36)$$
$$< application >< term >\Rightarrow \quad (37)$$
$$< term >< term >< term >\Rightarrow \quad (38)$$
$$< defname >< defname >< defname >\Rightarrow \quad (39)$$
$$SKK \Rightarrow \quad (40)$$

Итог:

```
let S = \ x y z.x z (y z)
let K = \ x y.x
S K K
```