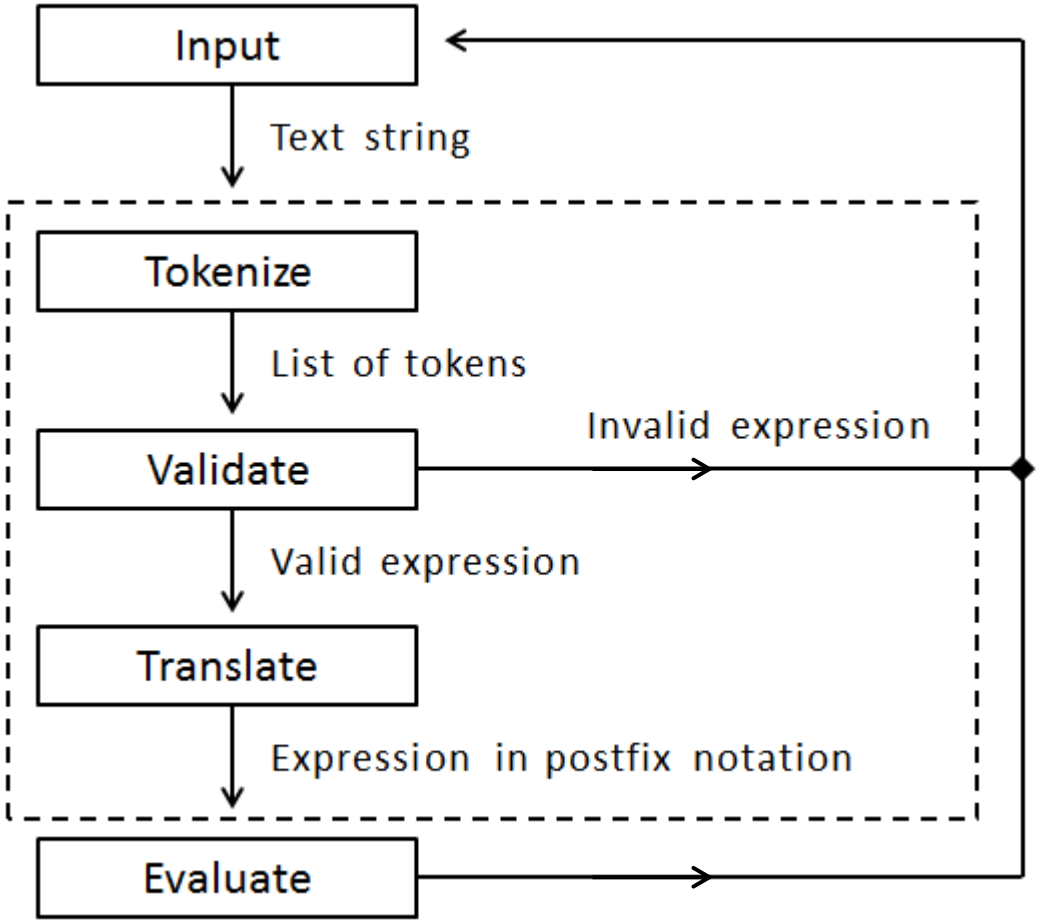
Abacus

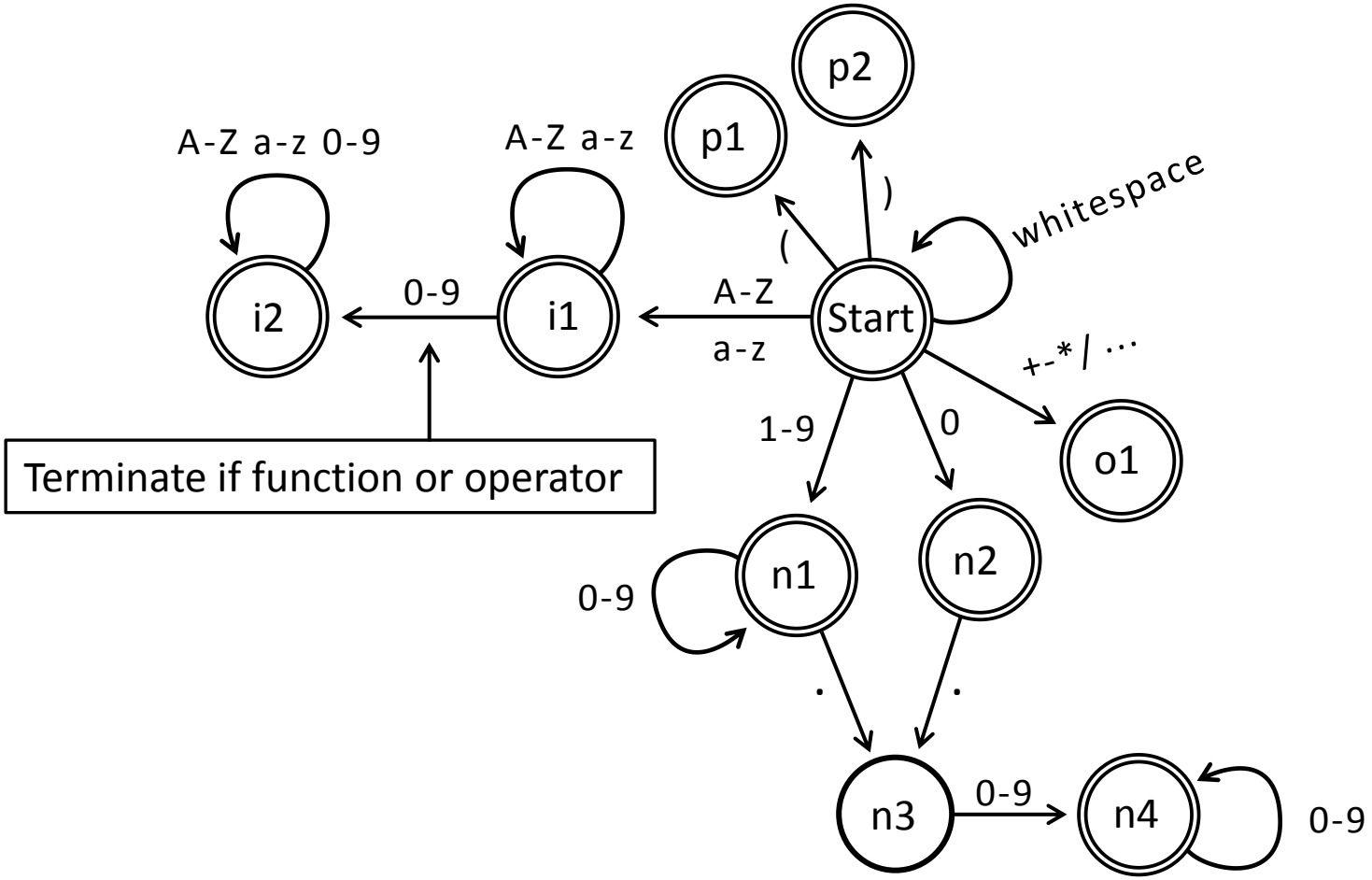
by

Micael Loberg Wenting Jin Tommy Vågratt

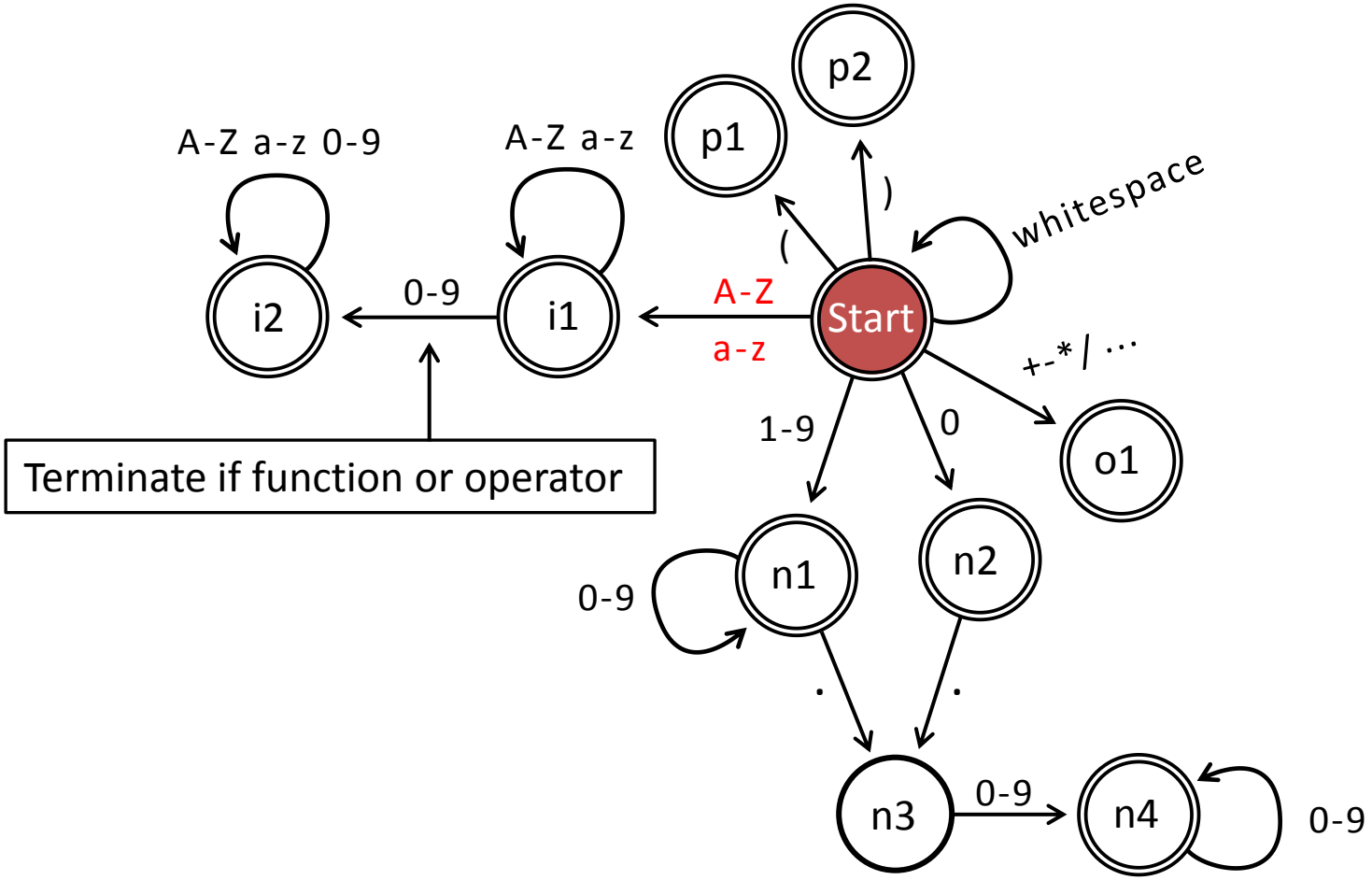

Input
Text string
Tokenize
List of tokens
Validate
Invalid expression
Valid expression
Translate
Expression in postfix notation
Evaluate

Tokenize

x1 = -1.6 * cos(Pi)


p2
p1
A-Z a-z 0-9
A-Z a-z
)
(
whitespace
i2
0-9
i1
A-Z
a-z
Start
+-*/ …
1-9
0
o1
Terminate if function or operator
n1
n2
0-9
.
.
n3
0-9
n4
0-9

x1 = -1.6 * cos(Pi)


p2
p1
A-Z a-z 0-9
A-Z a-z
)
(
whitespace
i2
0-9
i1
A-Z
a-z
Start
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Terminate if function or operator
n1
n2
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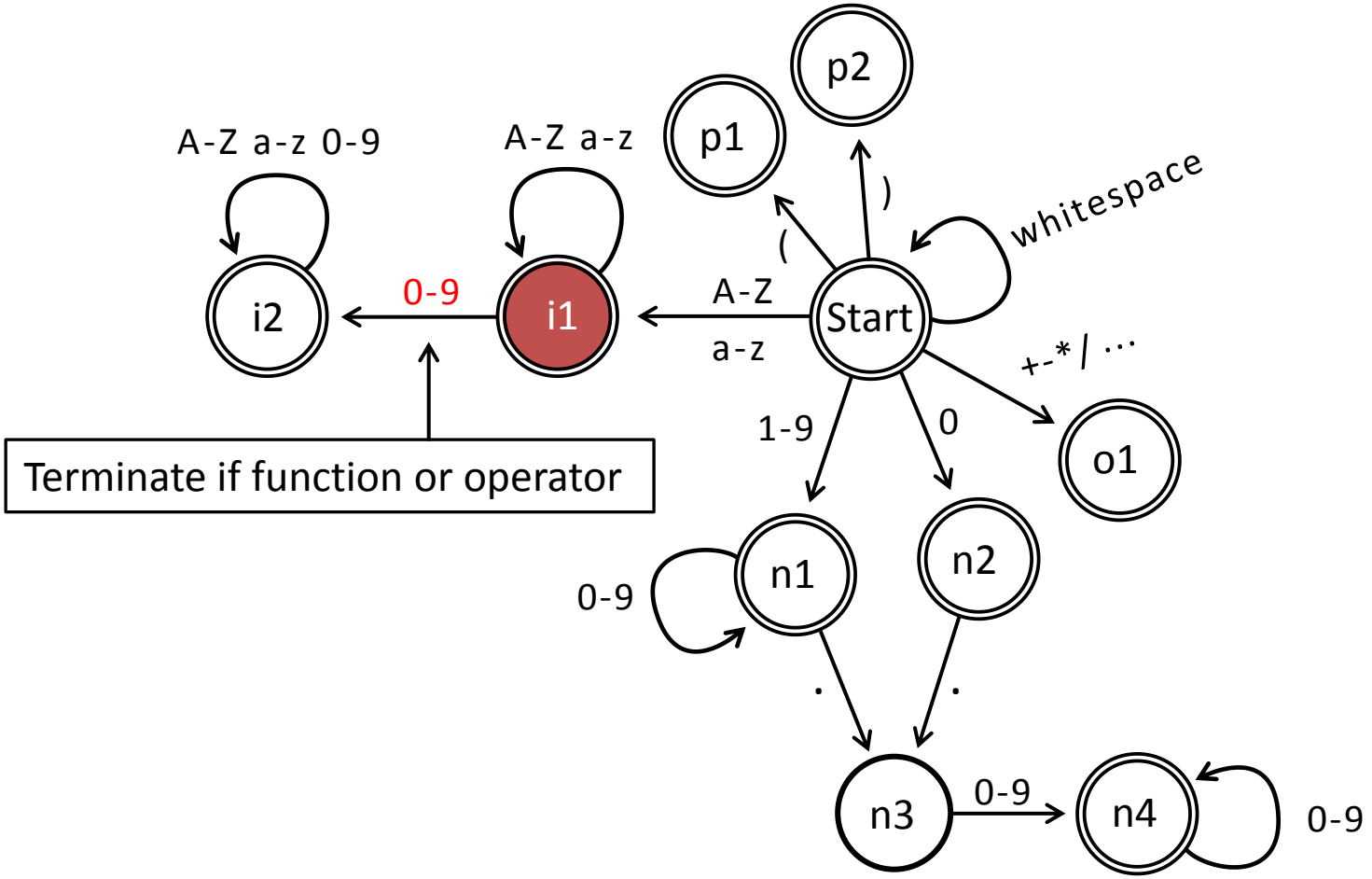
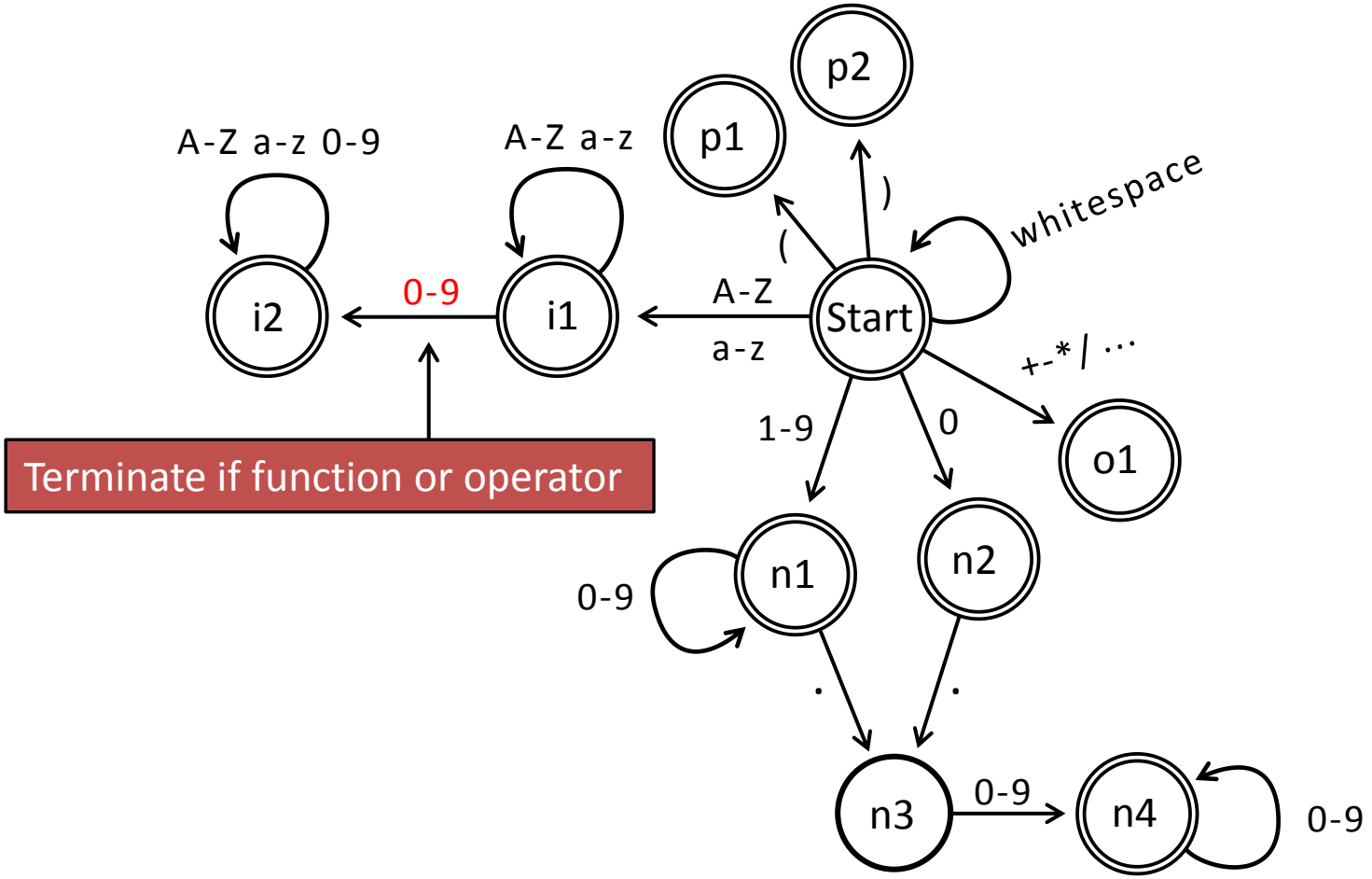
.
.
n3
0-9
n4
0-9

x1 = -1.6 * cos(Pi)


p2
p1
A-Z a-z 0-9
A-Z a-z
)
(
whitespace
i2
0-9
i1
A-Z
a-z
Start
+-*/ …
1-9
0
o1
Terminate if function or operator
n1
n2
0-9
.
.
n3
0-9
n4
0-9

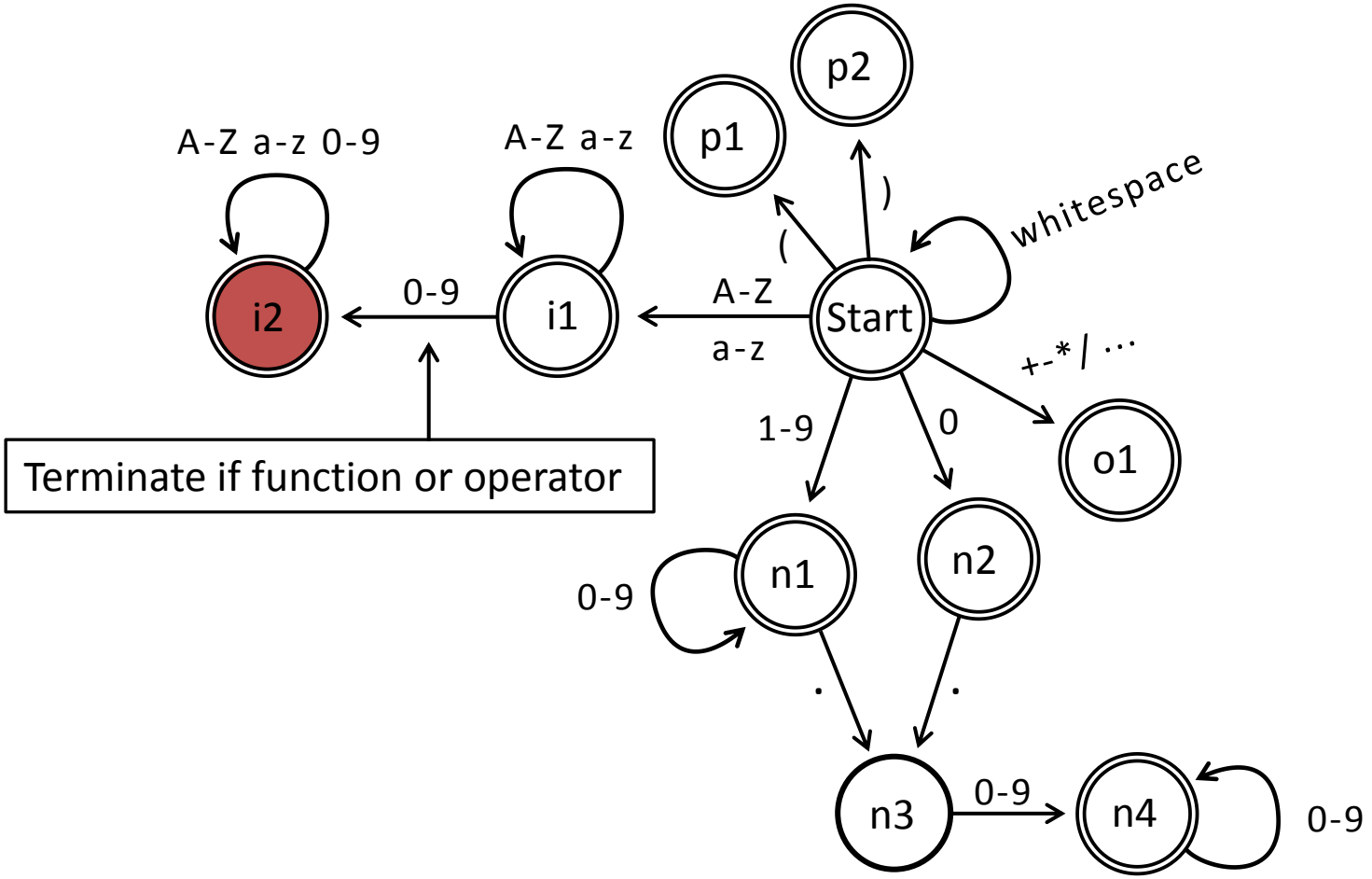
x

x1 = -1.6 * cos(Pi)


A-Z a-z 0-9
A-Z a-z
p1
p2
)
whitespace
(
i2
0-9
i1
A-Z
a-z
Start
+-*/ …
1-9
0
o1
Terminate if function or operator
n1
n2
0-9
.
.
n3
0-9
n4
0-9

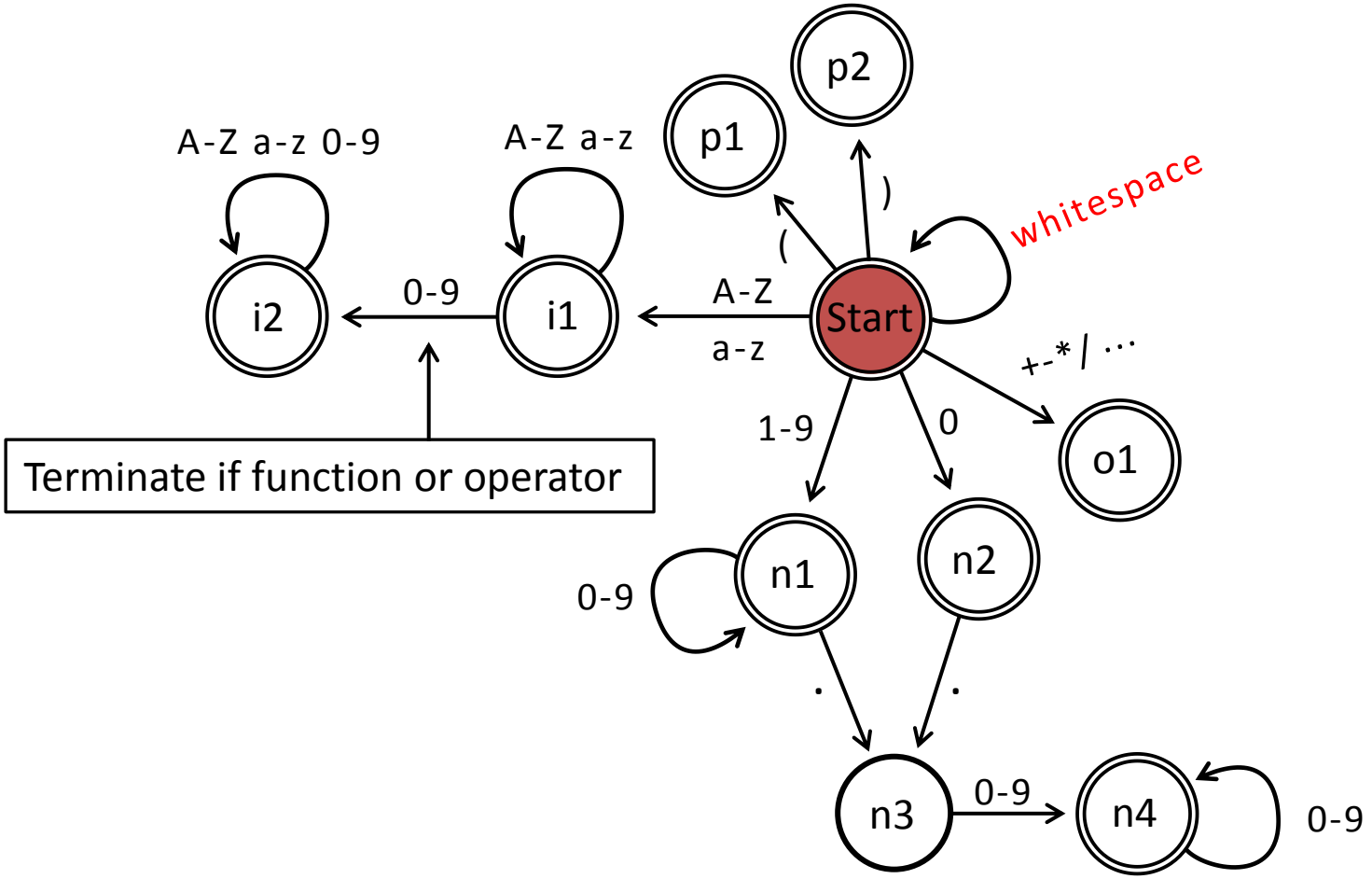
x

x1 = -1.6 * cos(Pi)



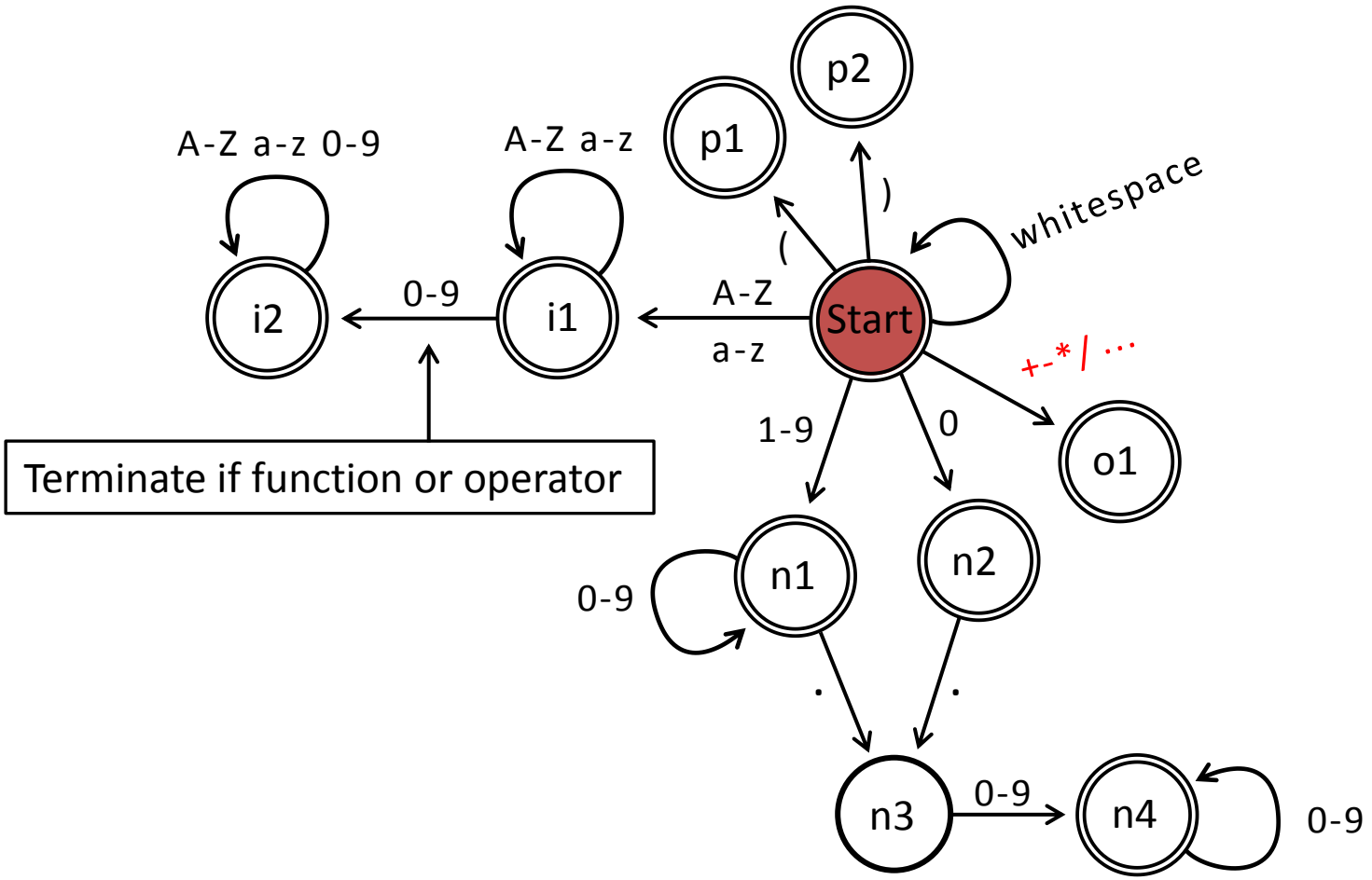
x1

x1 = -1.6 * cos(Pi)



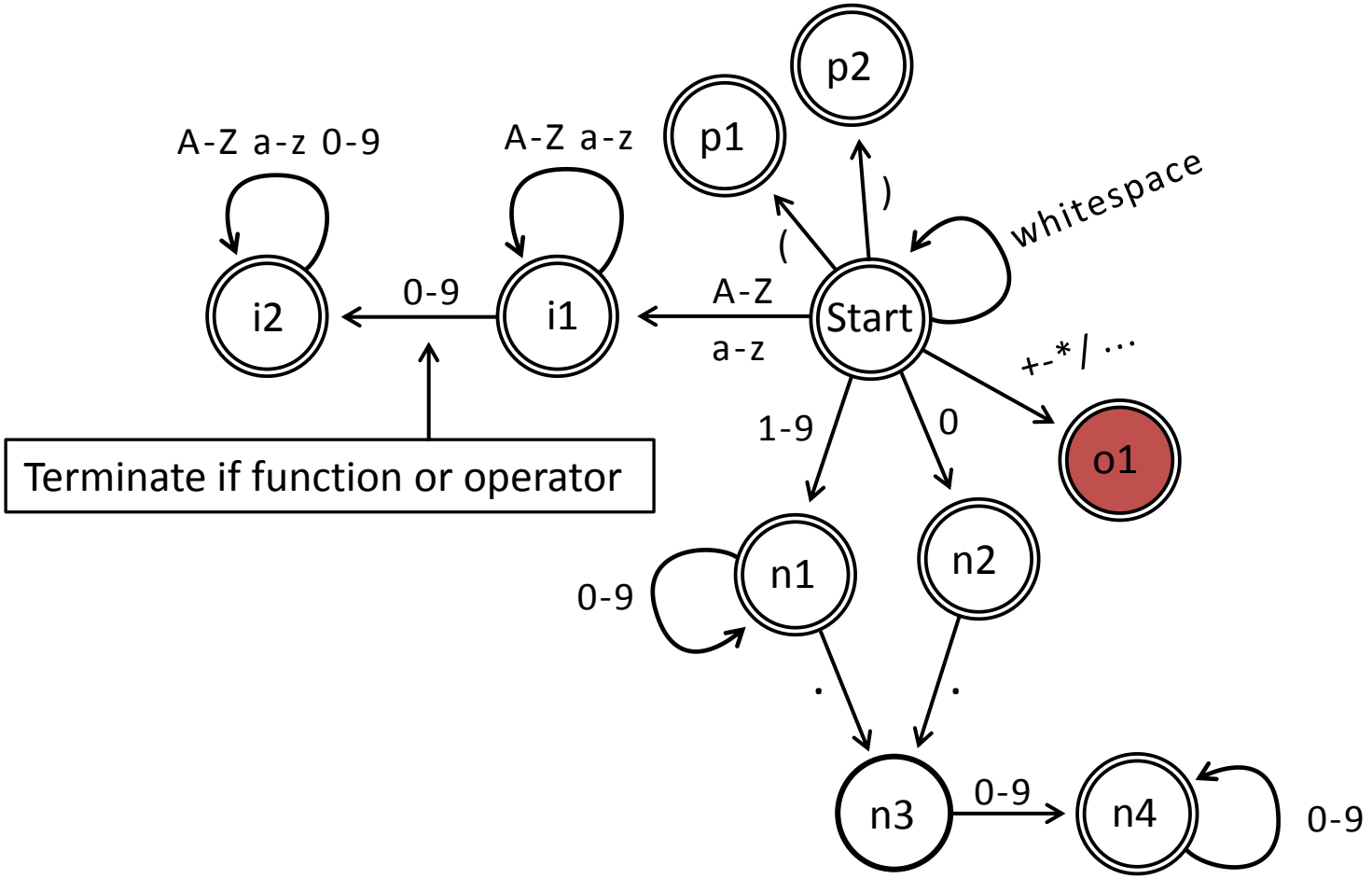
x1

x1 = -1.6 * cos(Pi)



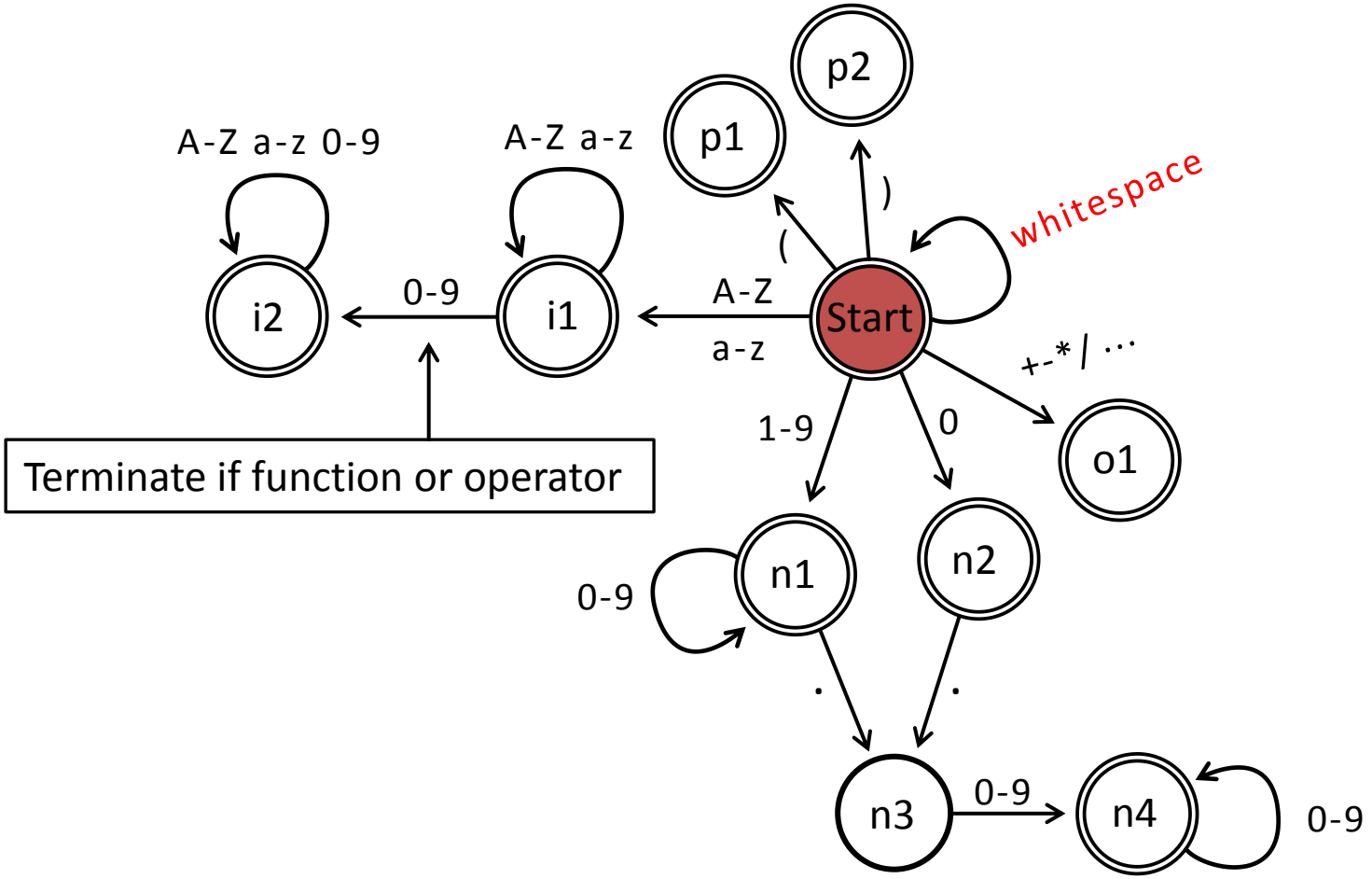
x1

x1 = -1.6 * cos(Pi)



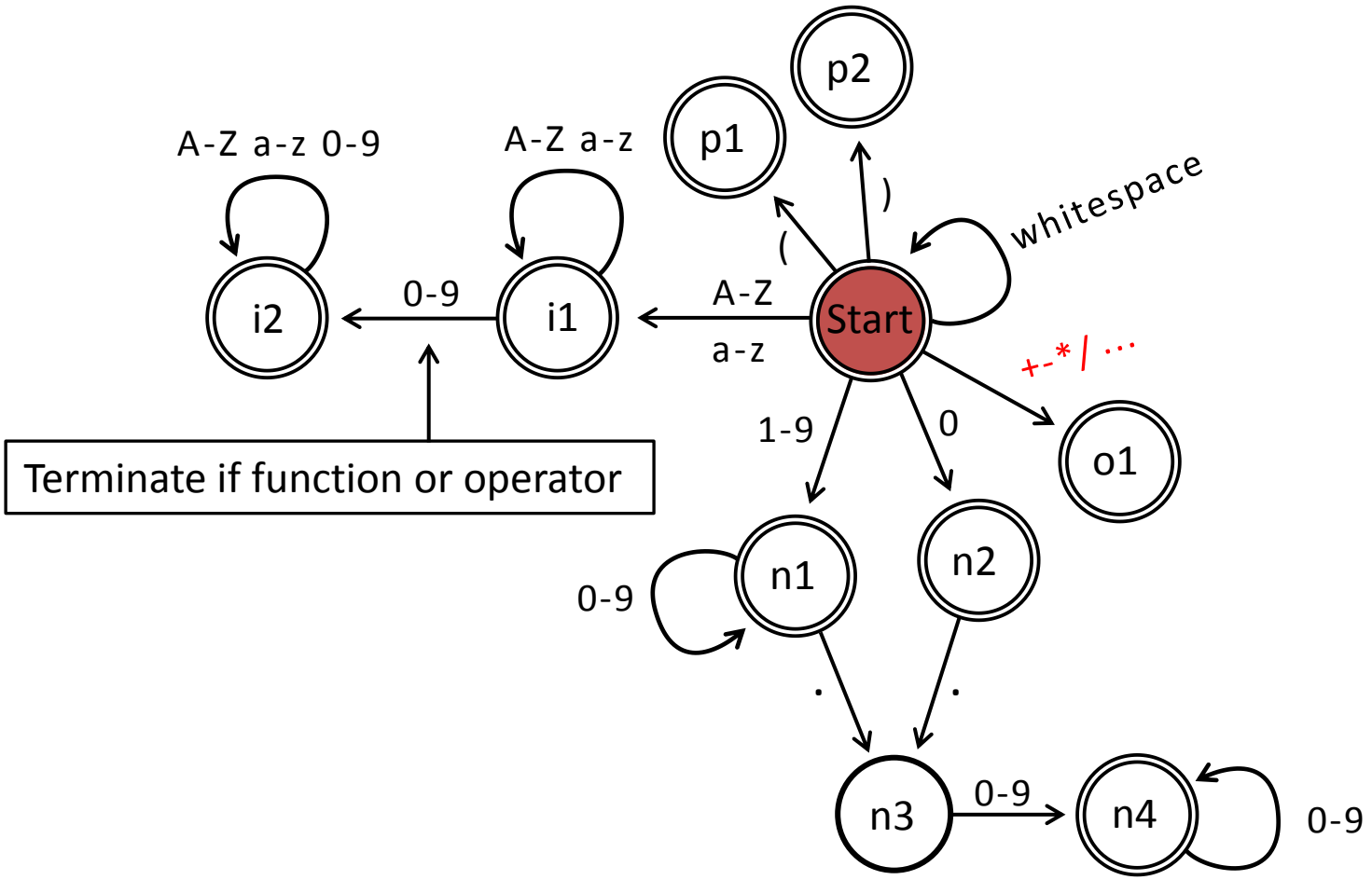
x1 =

x1 = -1.6 * cos(Pi)



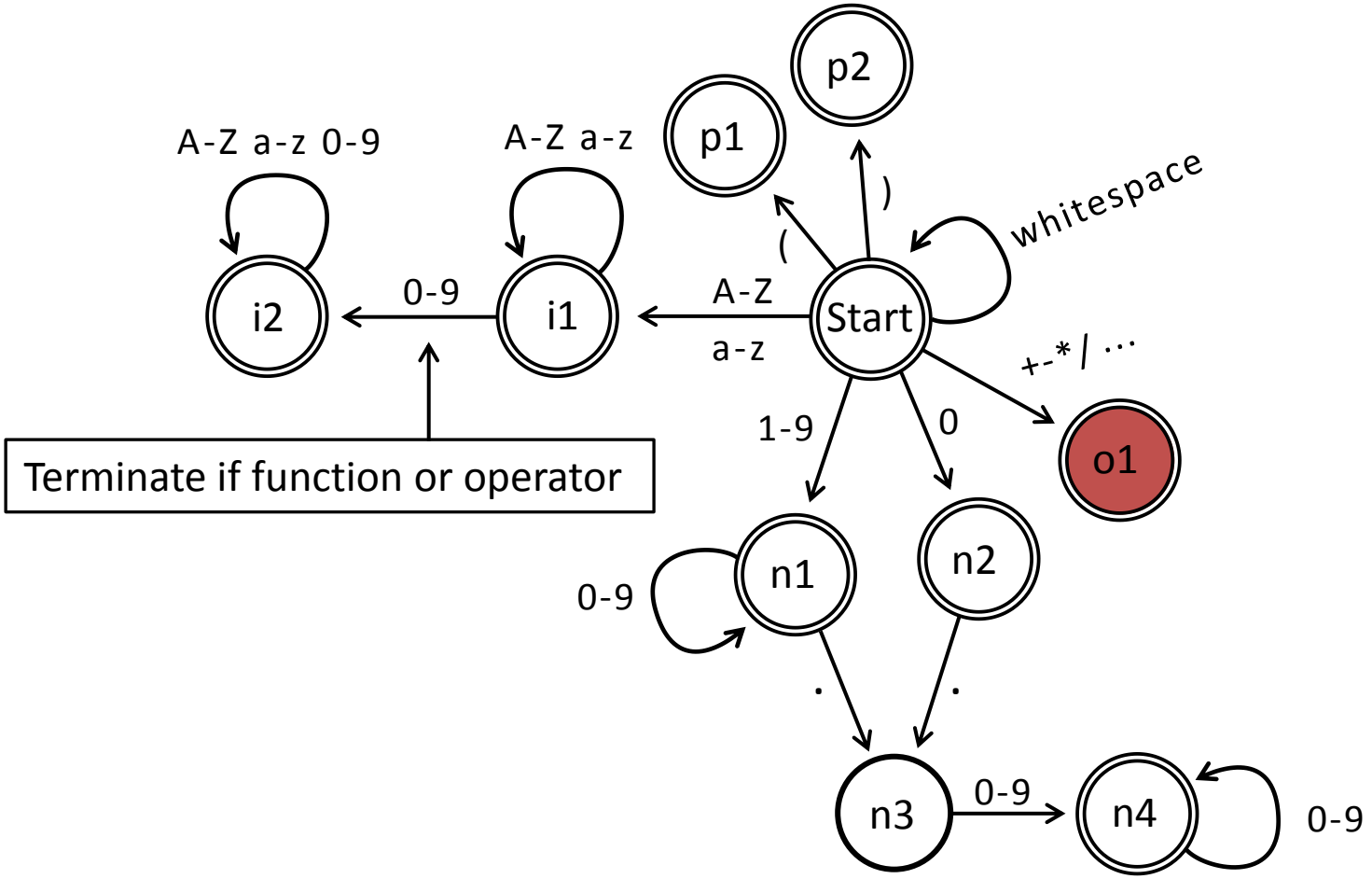
x1 | =

x1 = -1.6 * cos(Pi)



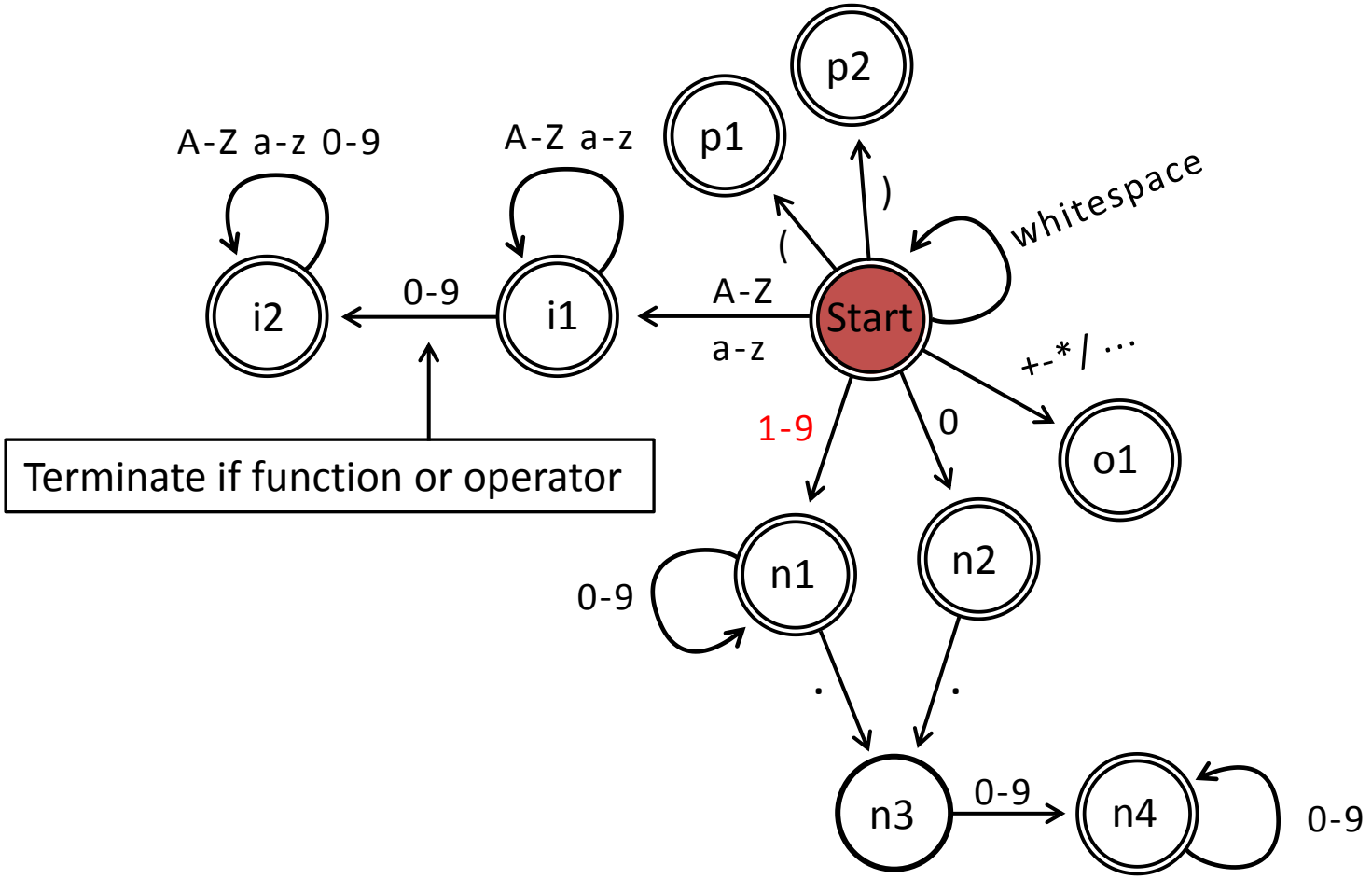
x1 | =

x1 = -1.6 * cos(Pi)



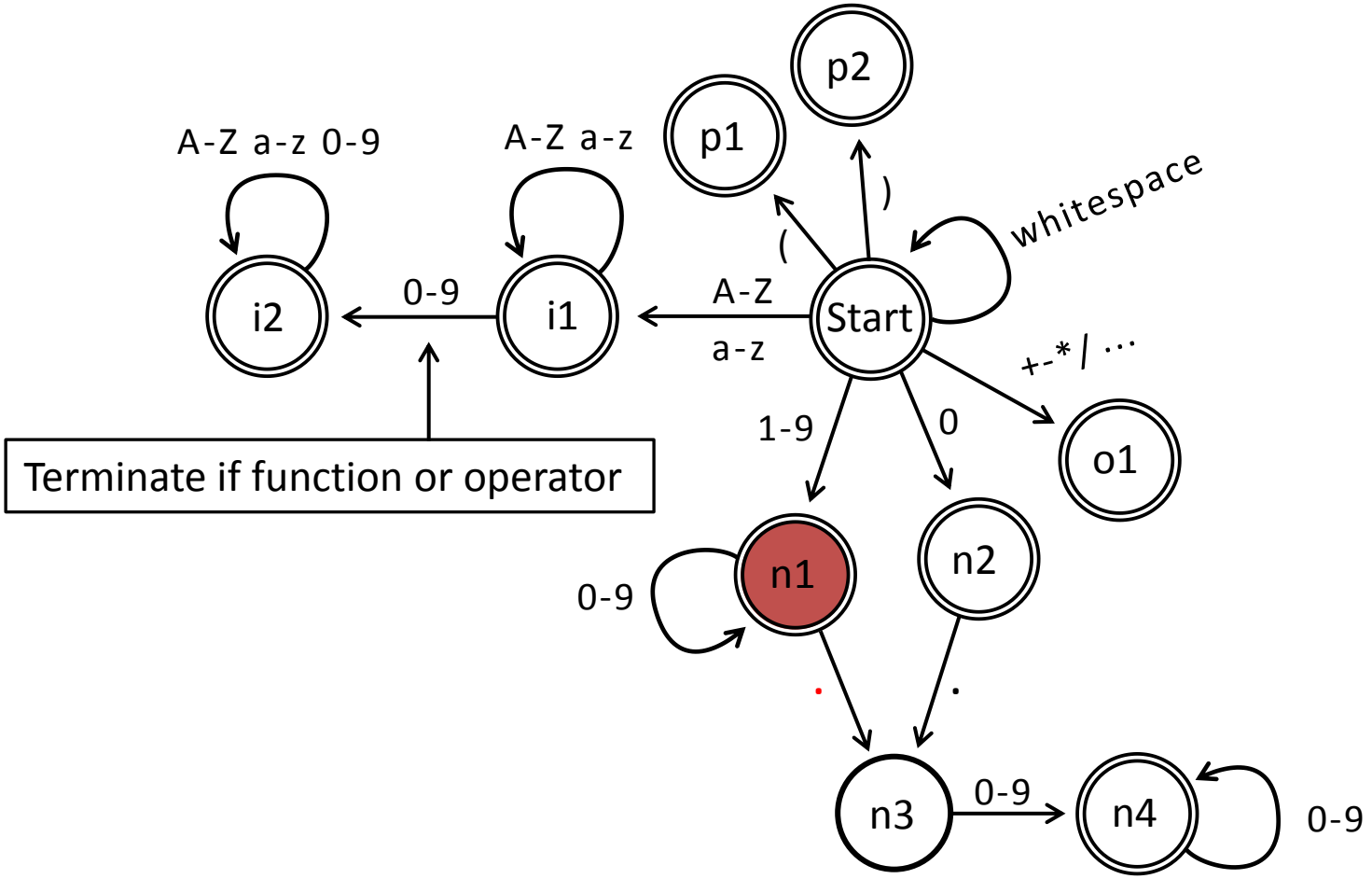
x1 = -

x1 = -1.6 * cos(Pi)



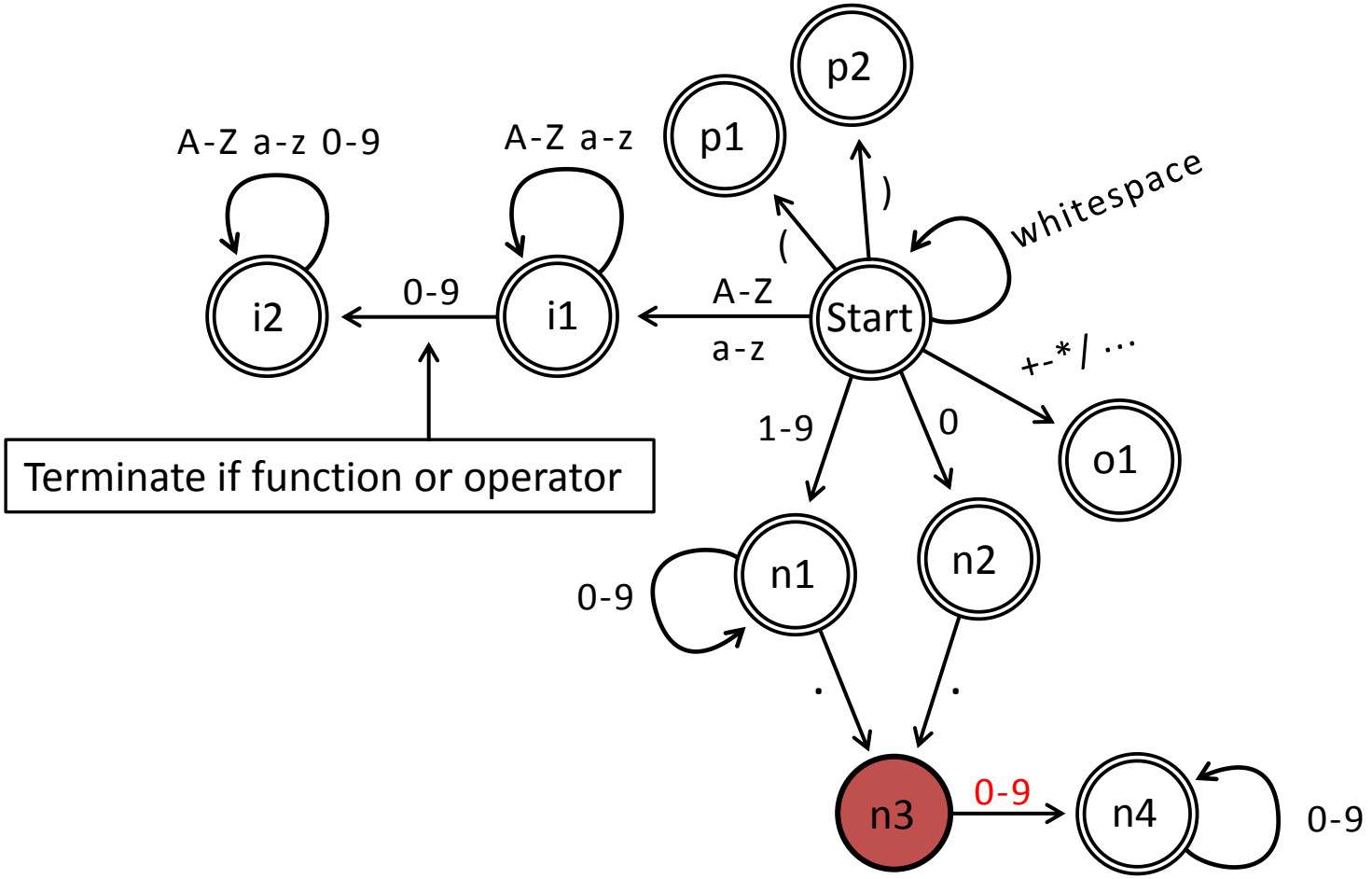
x1 | = | -

x1 = -1.6 * cos(Pi)



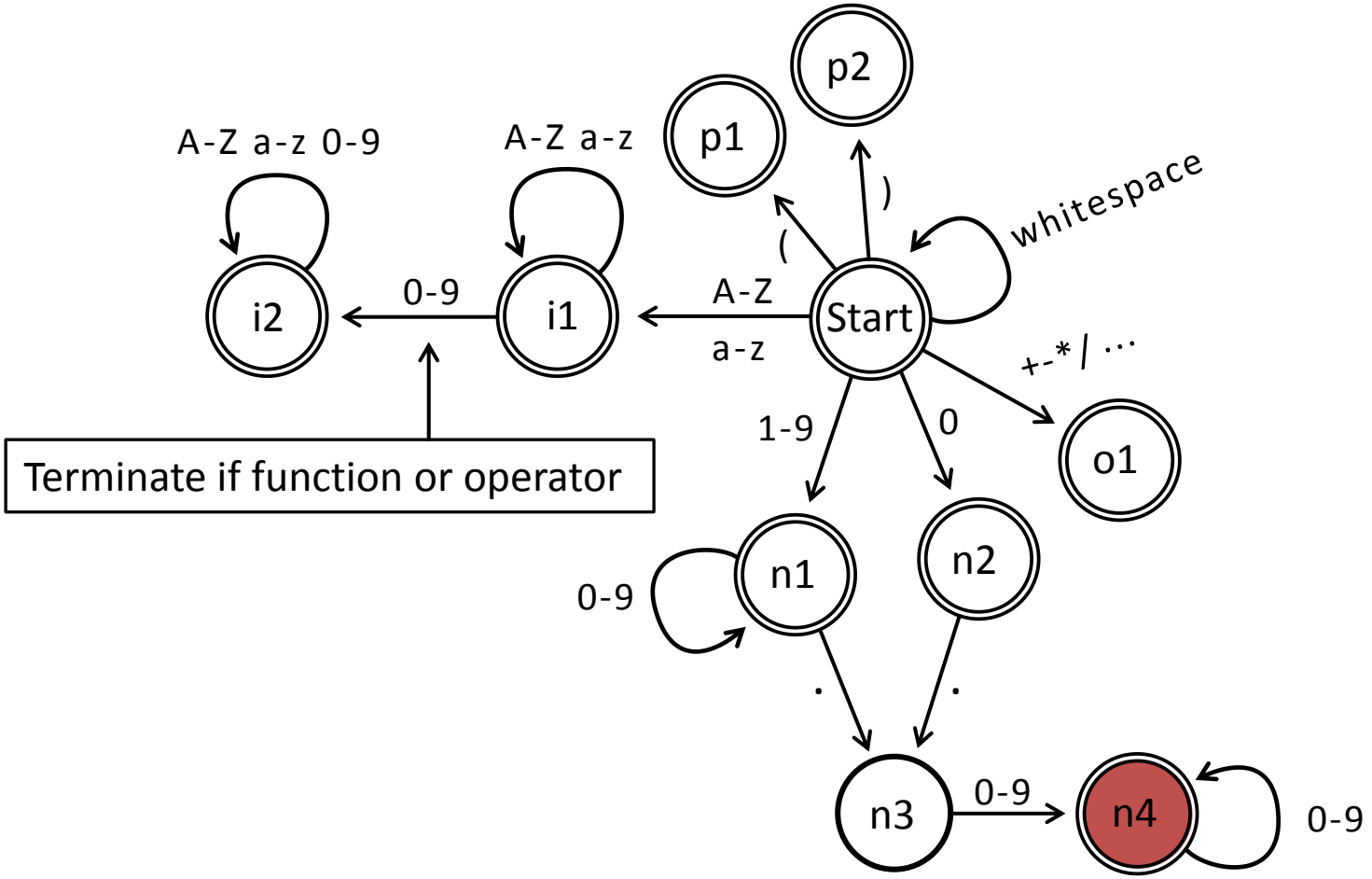
x1 | = | - | 1

x1 = -1.6 * cos(Pi)



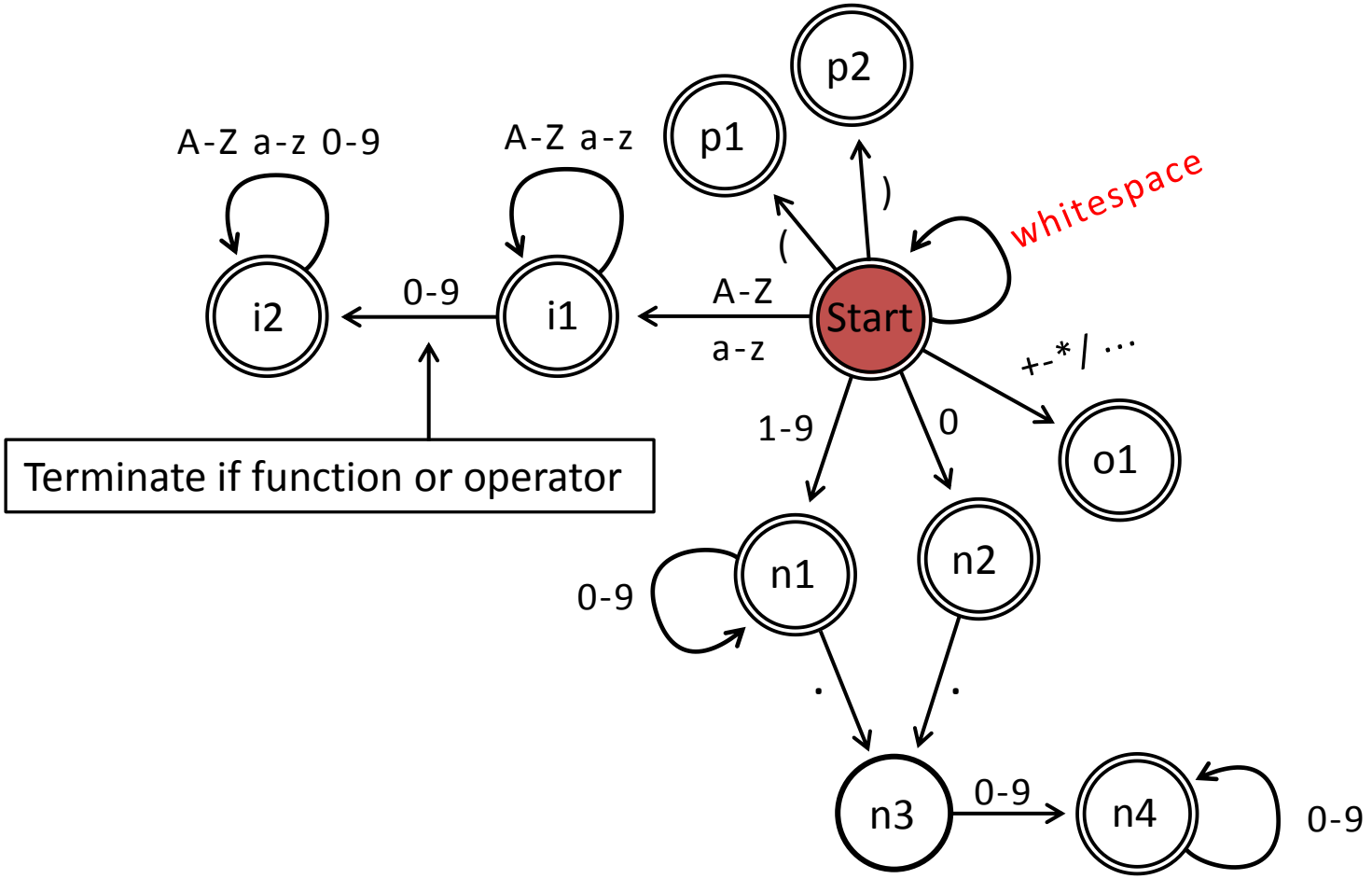
x1 = - 1.

x1 = -1.6 * cos(Pi)



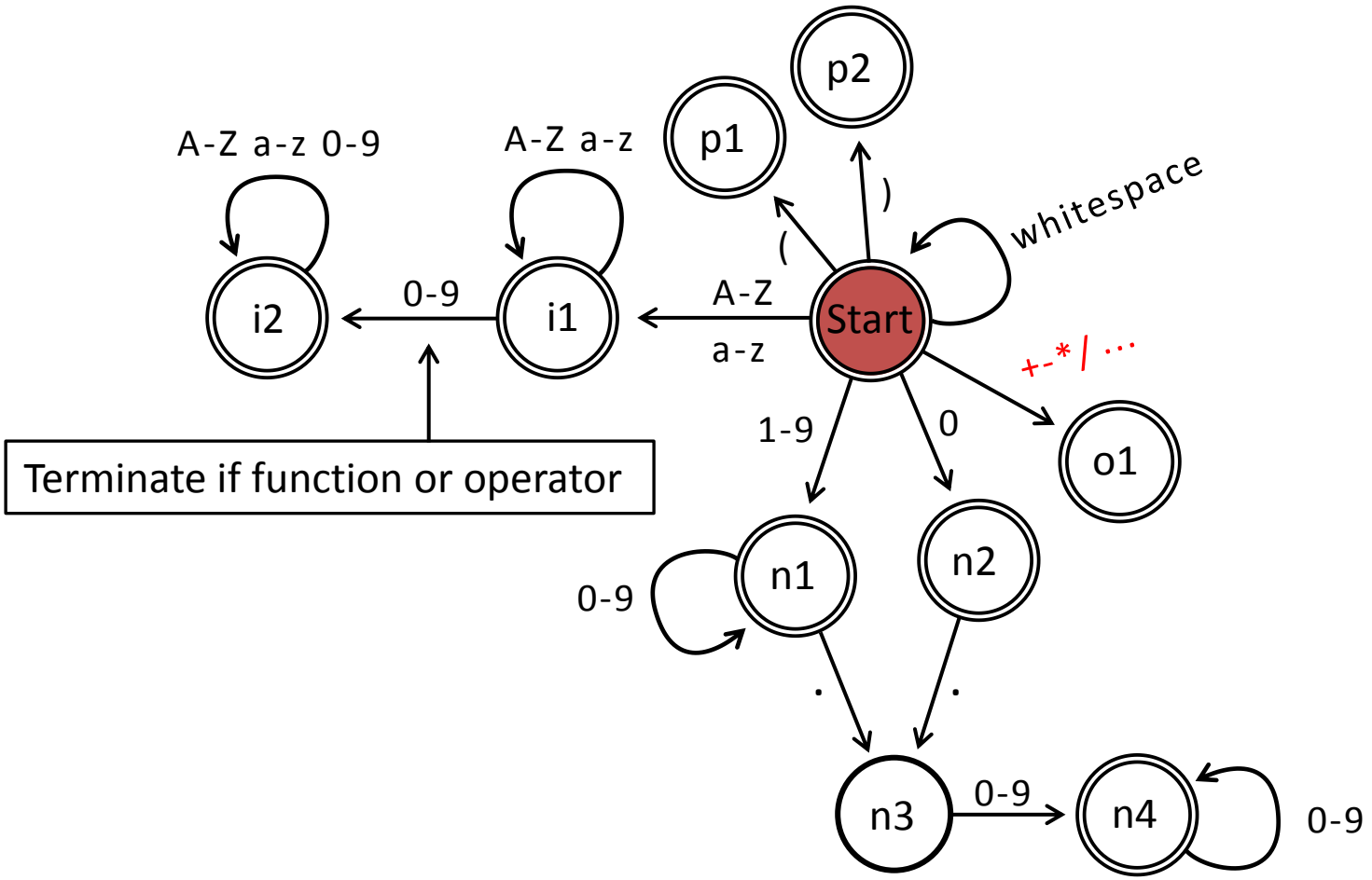
x1	=	-	1.6

x1 = -1.6 * cos(Pi)



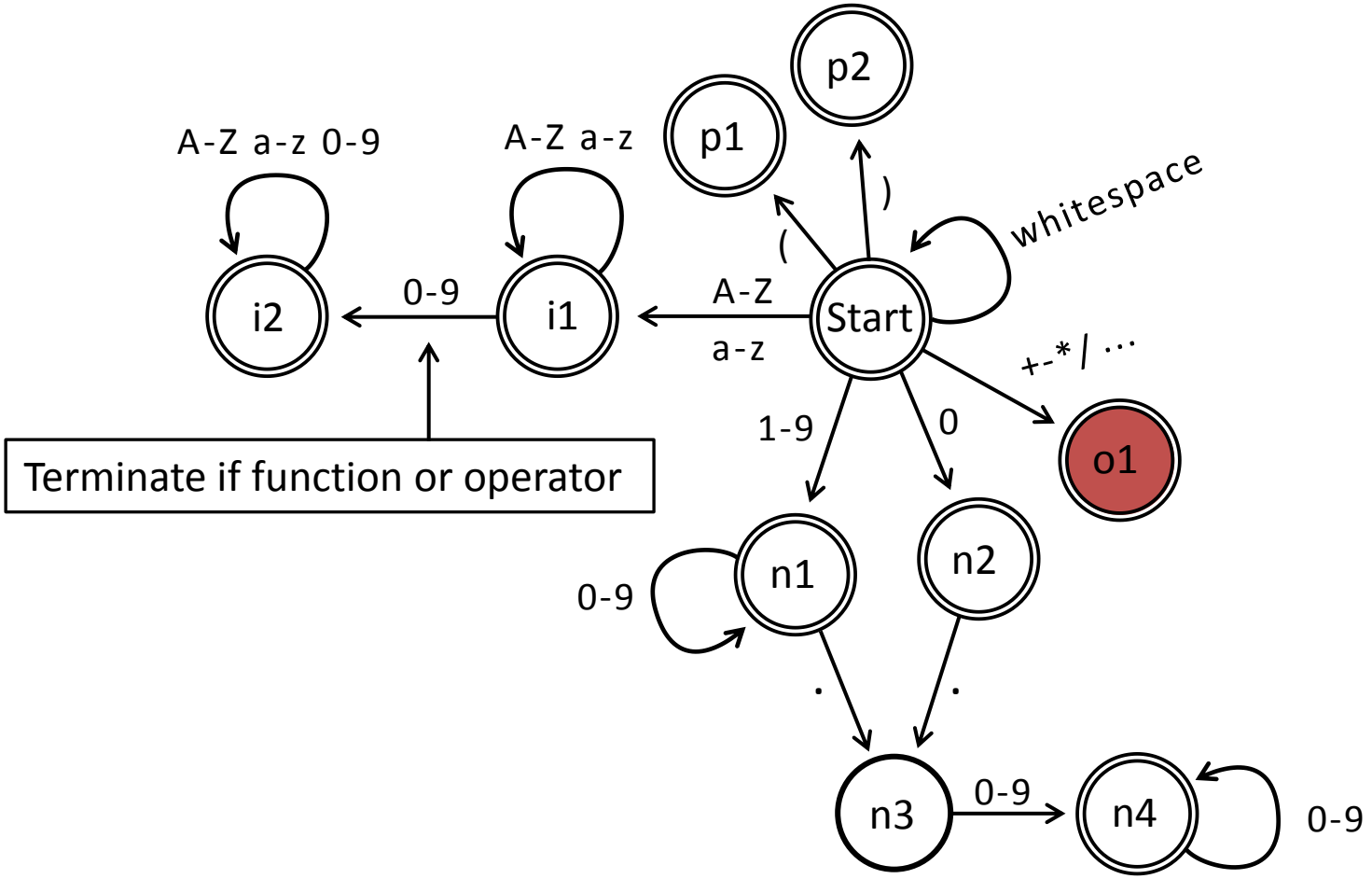
x1	=	-	1.6

x1 = -1.6 * cos(Pi)



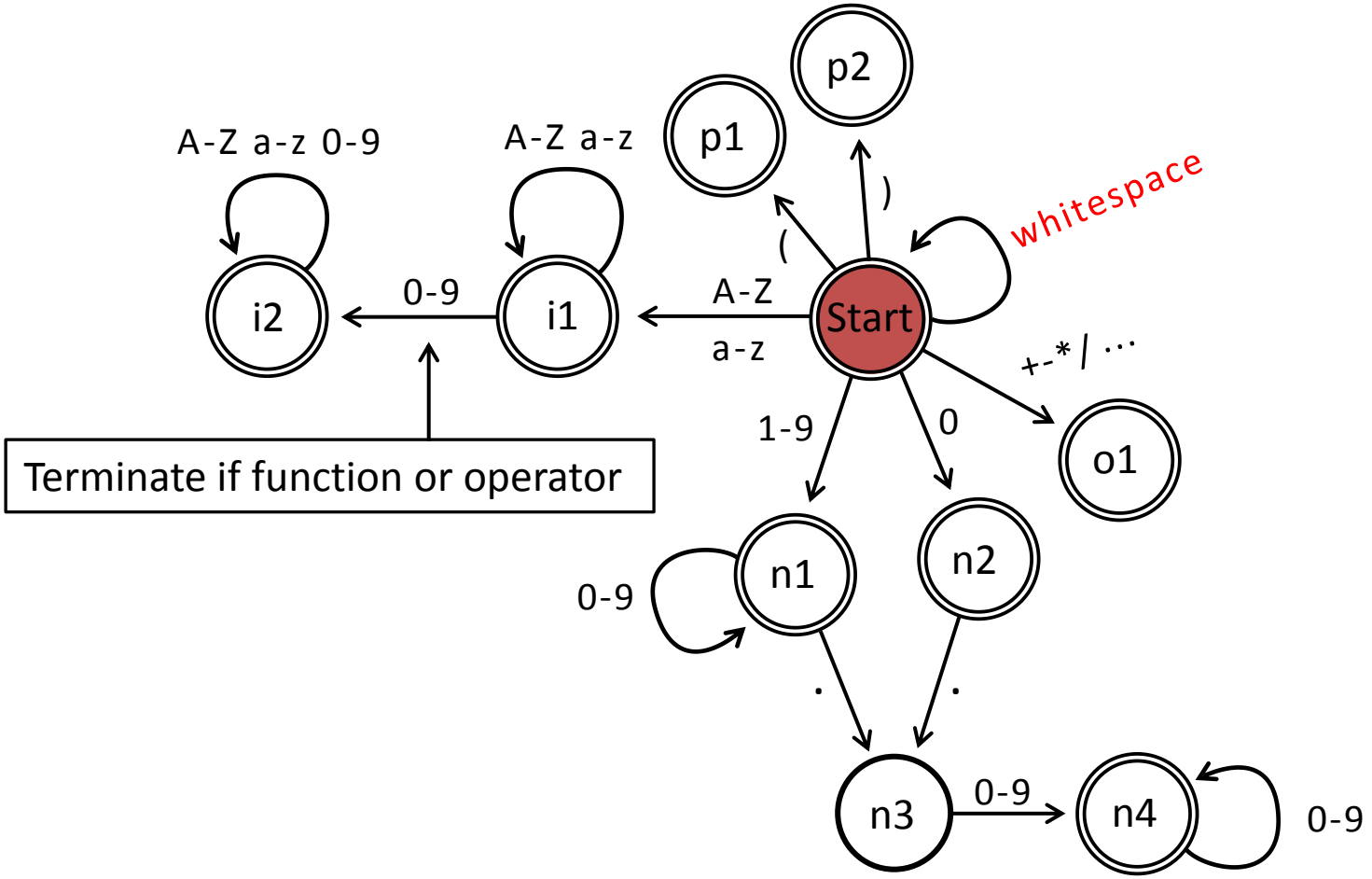
x1	=	-	1.6

x1 = -1.6 * cos(Pi)



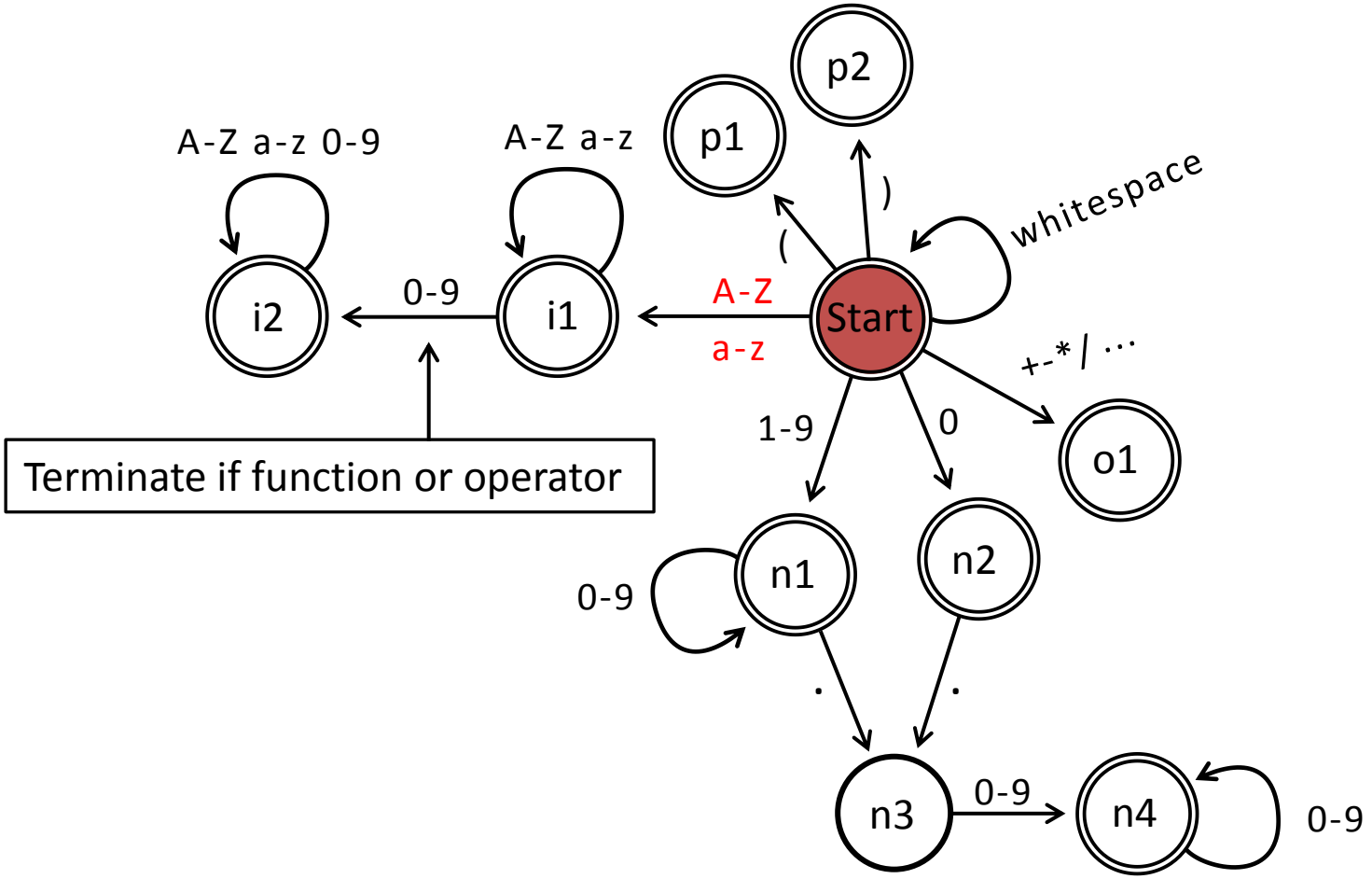
x1	=	-	1.6	*

x1 = -1.6 * cos(Pi)



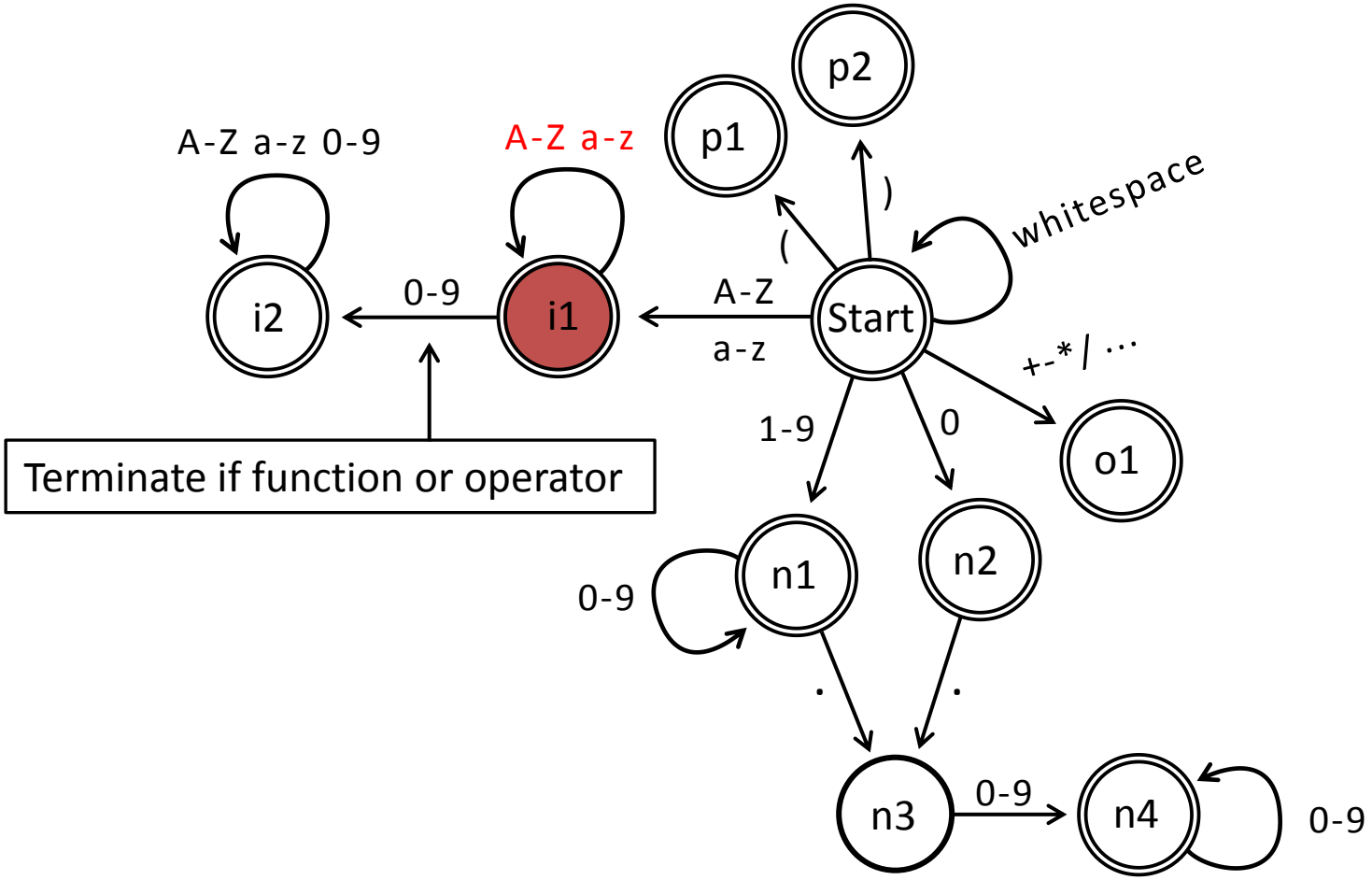
x1	=	-	1.6	*

x1 = -1.6 * cos(Pi)



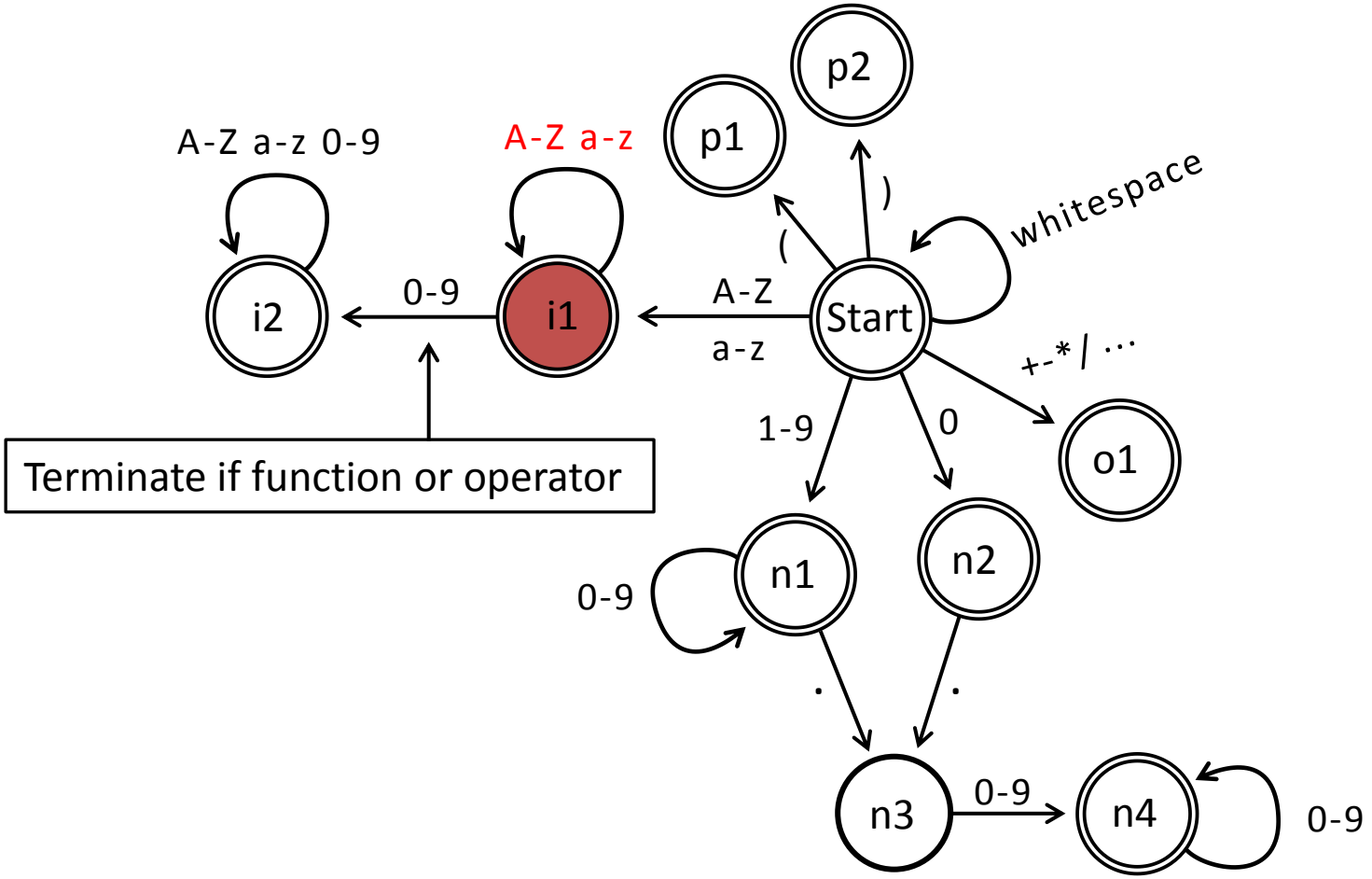
x1	=	-	1.6	*

x1 = -1.6 * cos(Pi)



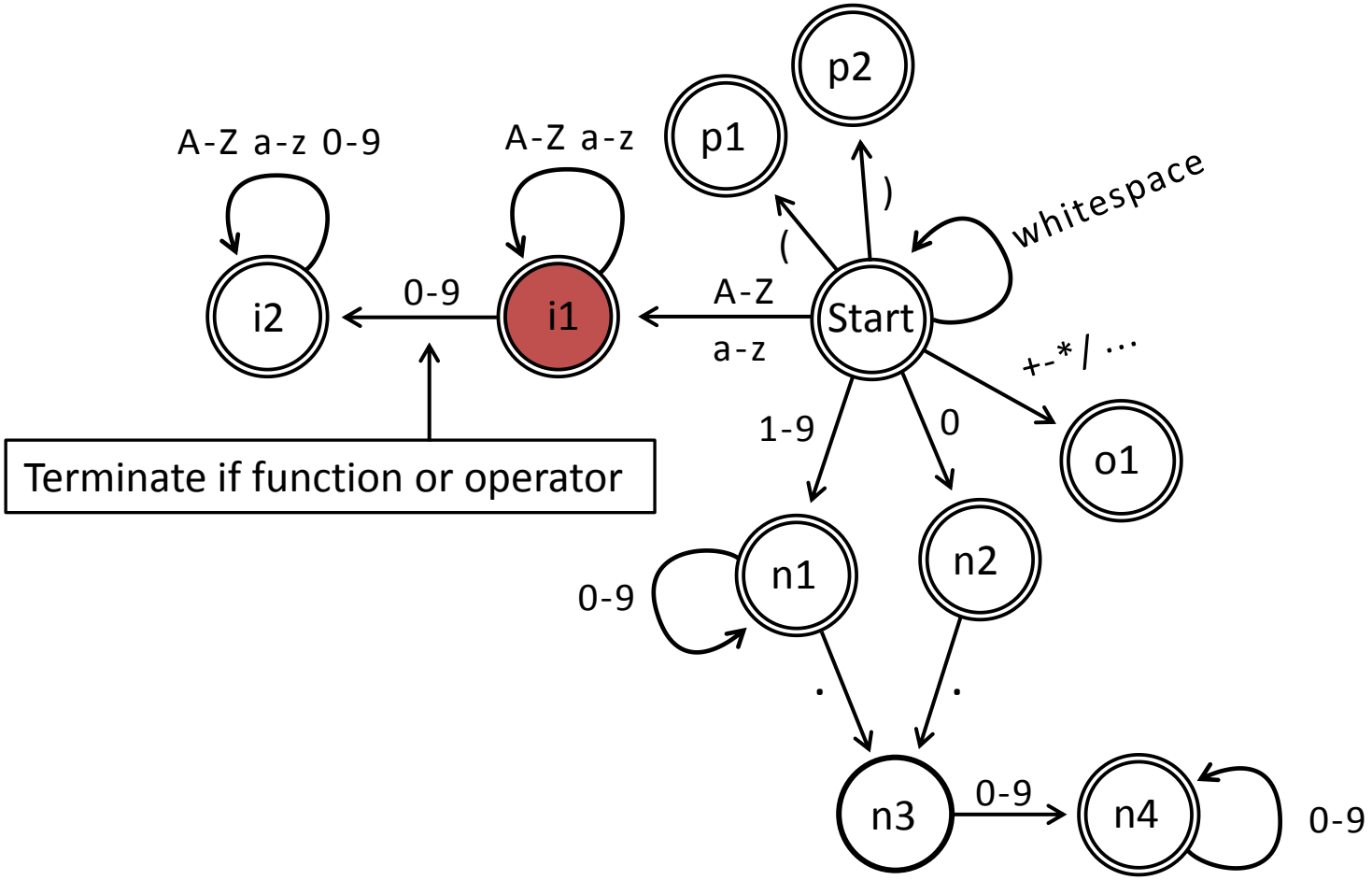
x1	=	-	1.6	*	c

x1 = -1.6 * cos(Pi)



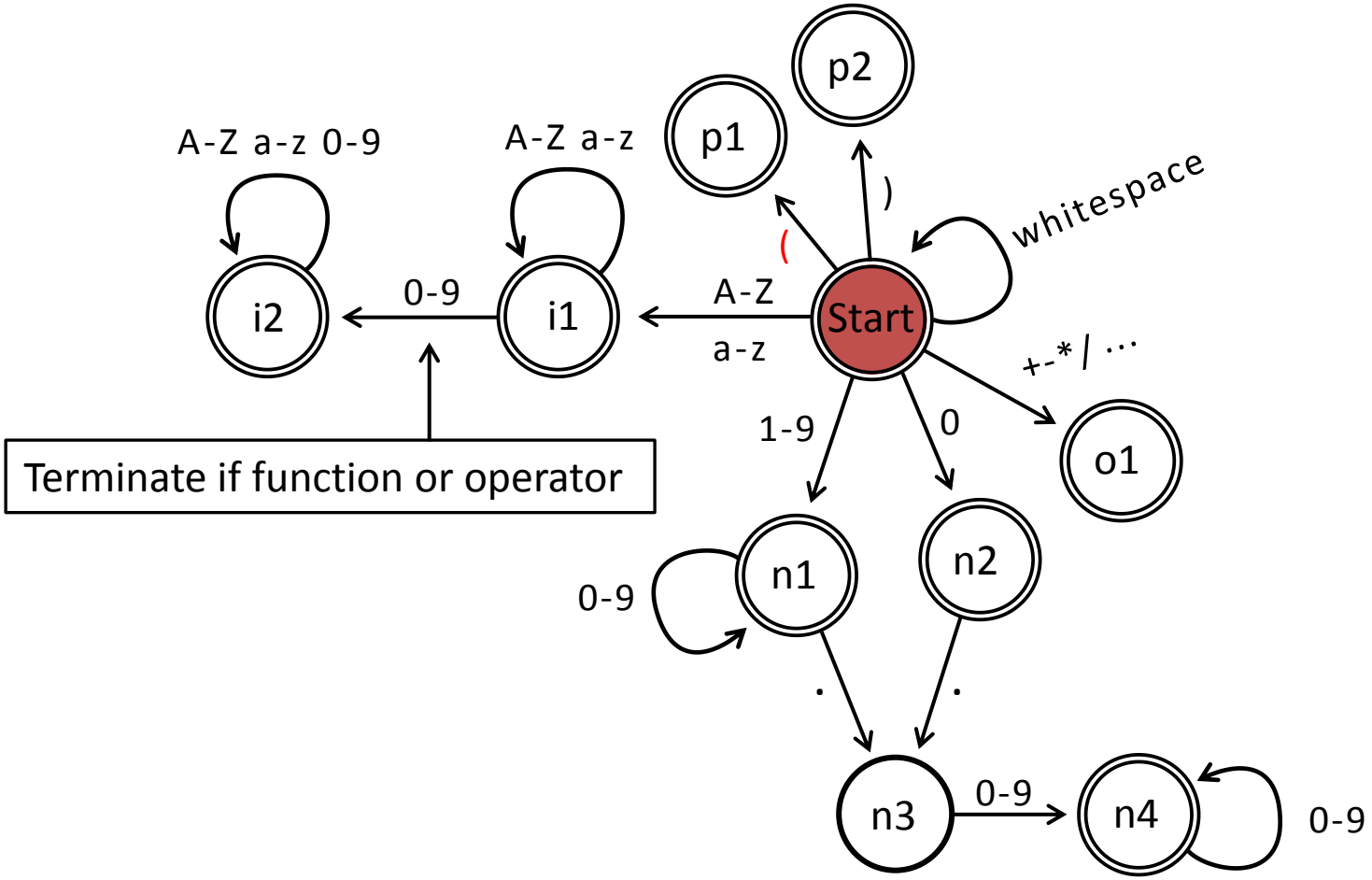
x1	=	-	1.6	*	co

x1 = -1.6 * cos(Pi)



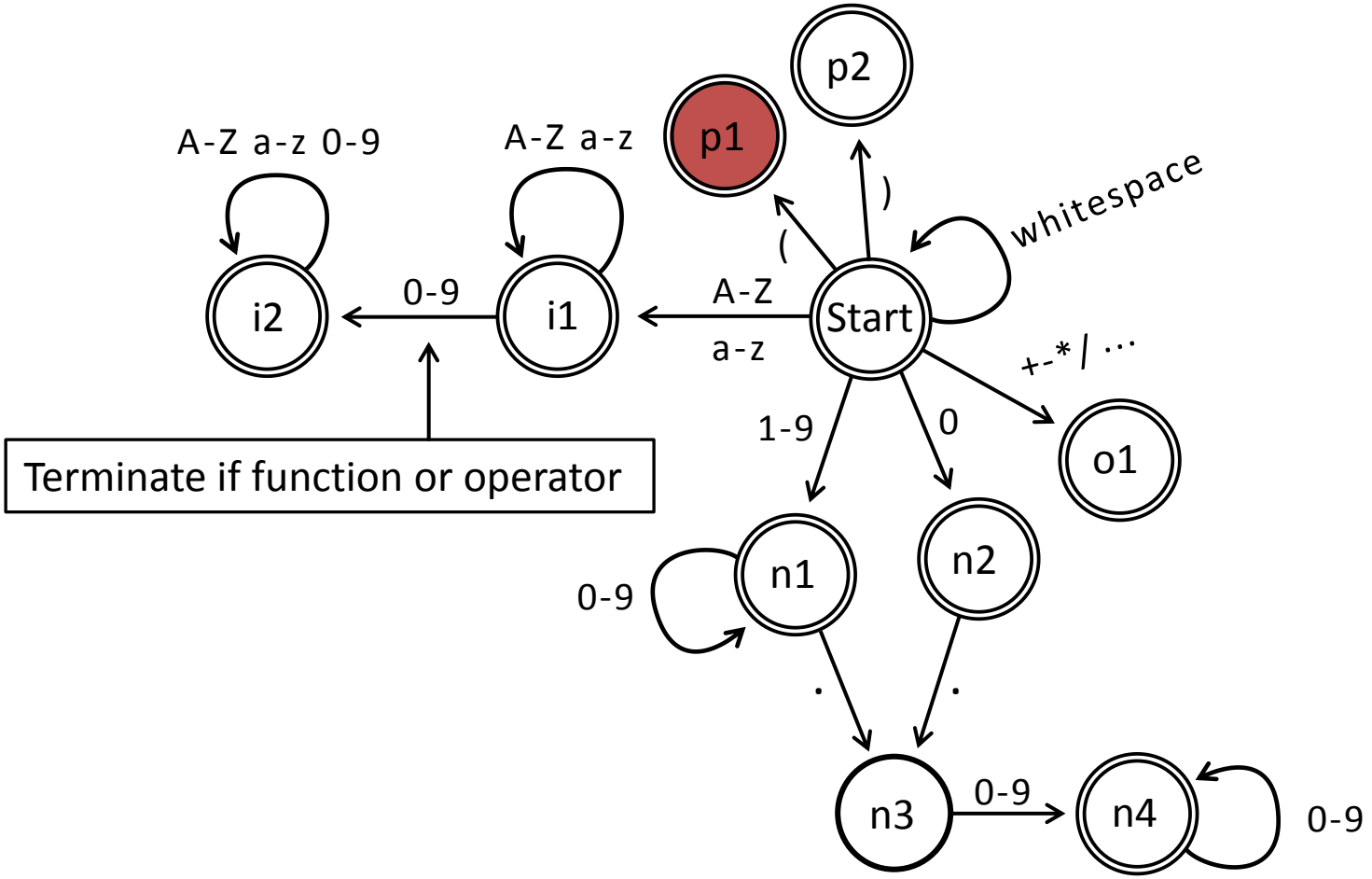
x1	=	-	1.6	*	cos

x1 = -1.6 * cos(Pi)



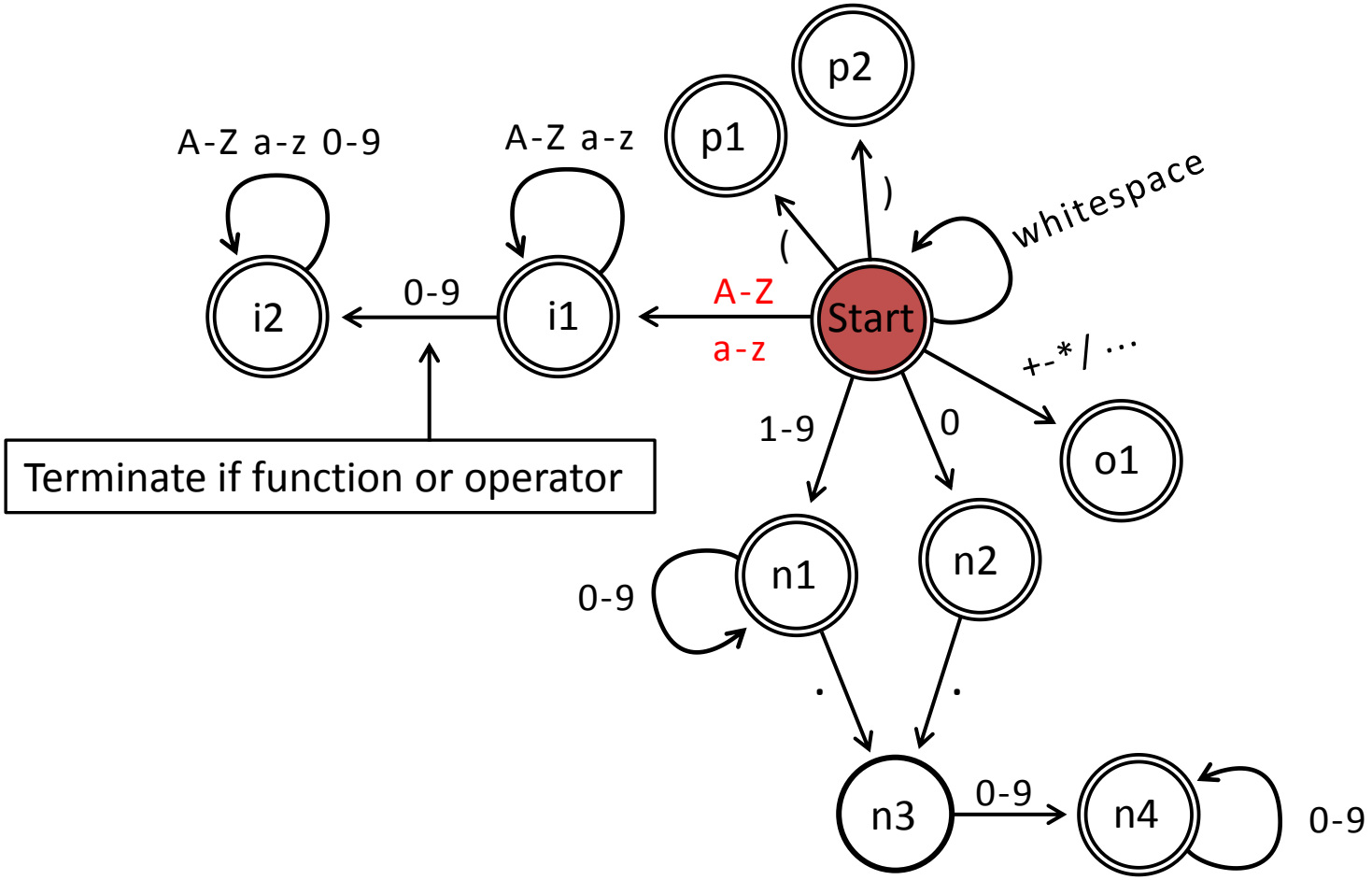
x1	=	-	1.6	*	cos

x1 = -1.6 * cos(Pi)



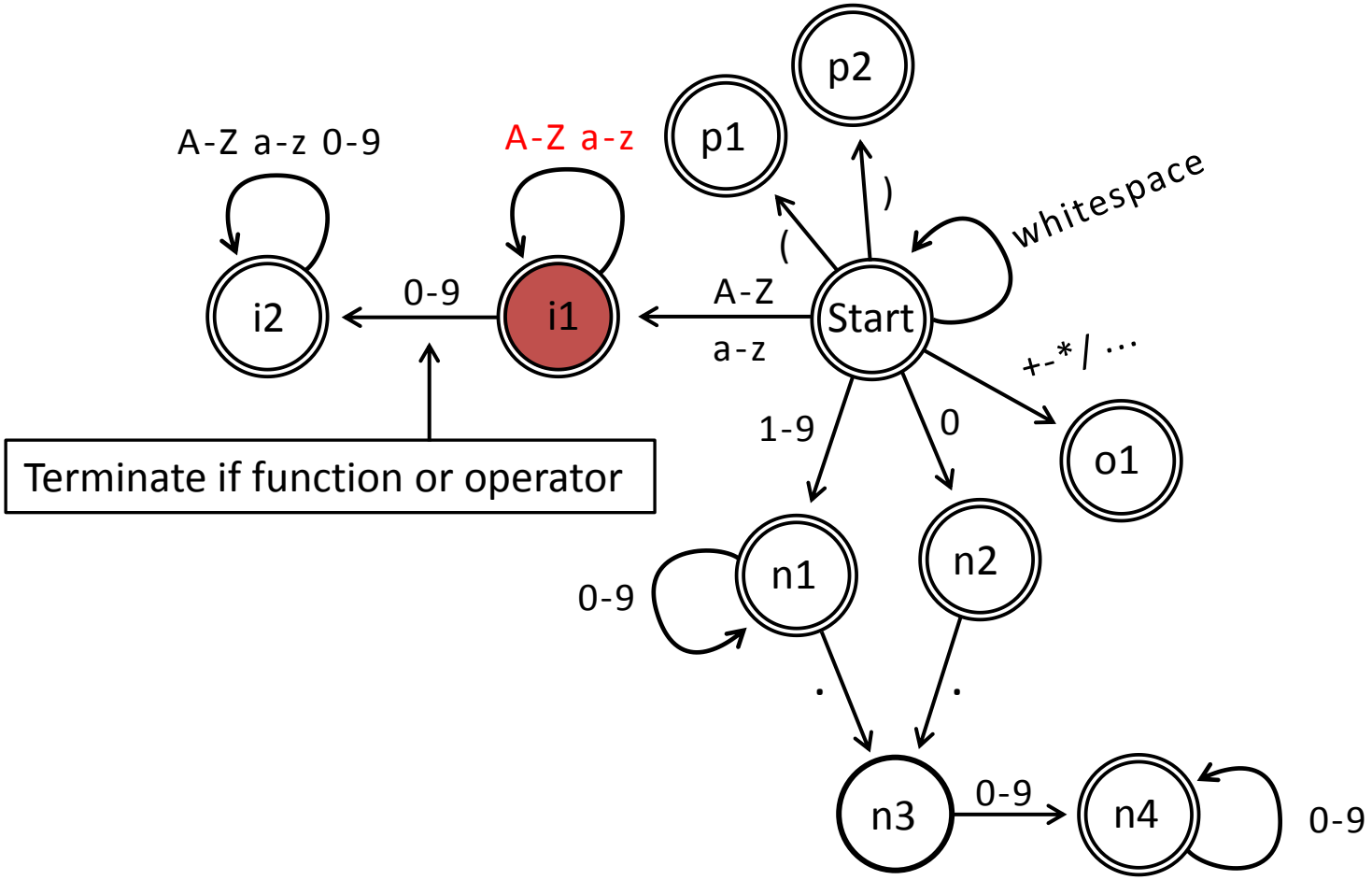
x1	=	-	1.6	*	cos	(

x1 = -1.6 * cos(Pi)



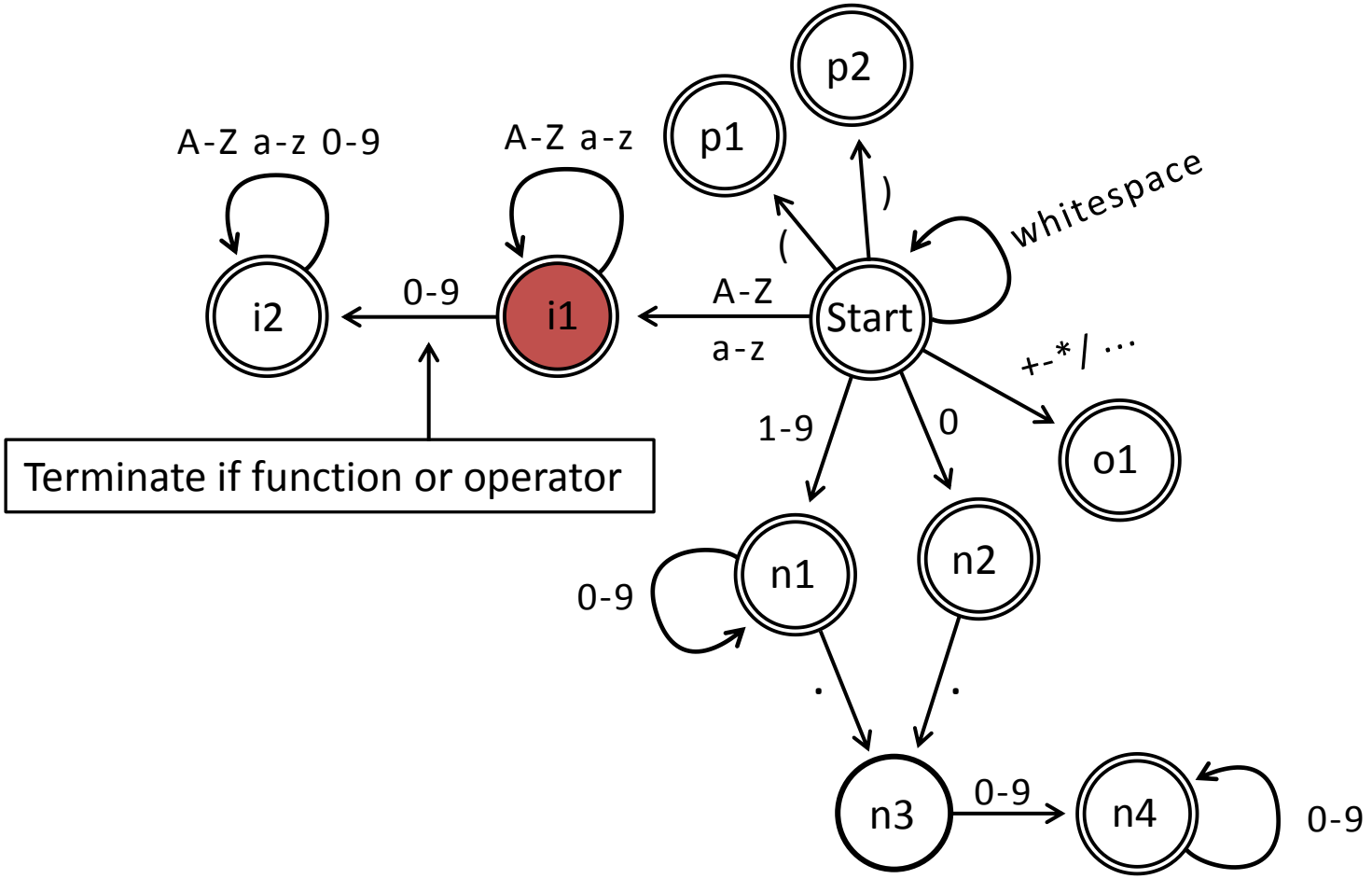
x1	=	-	1.6	*	cos	(

x1 = -1.6 * cos(Pi)



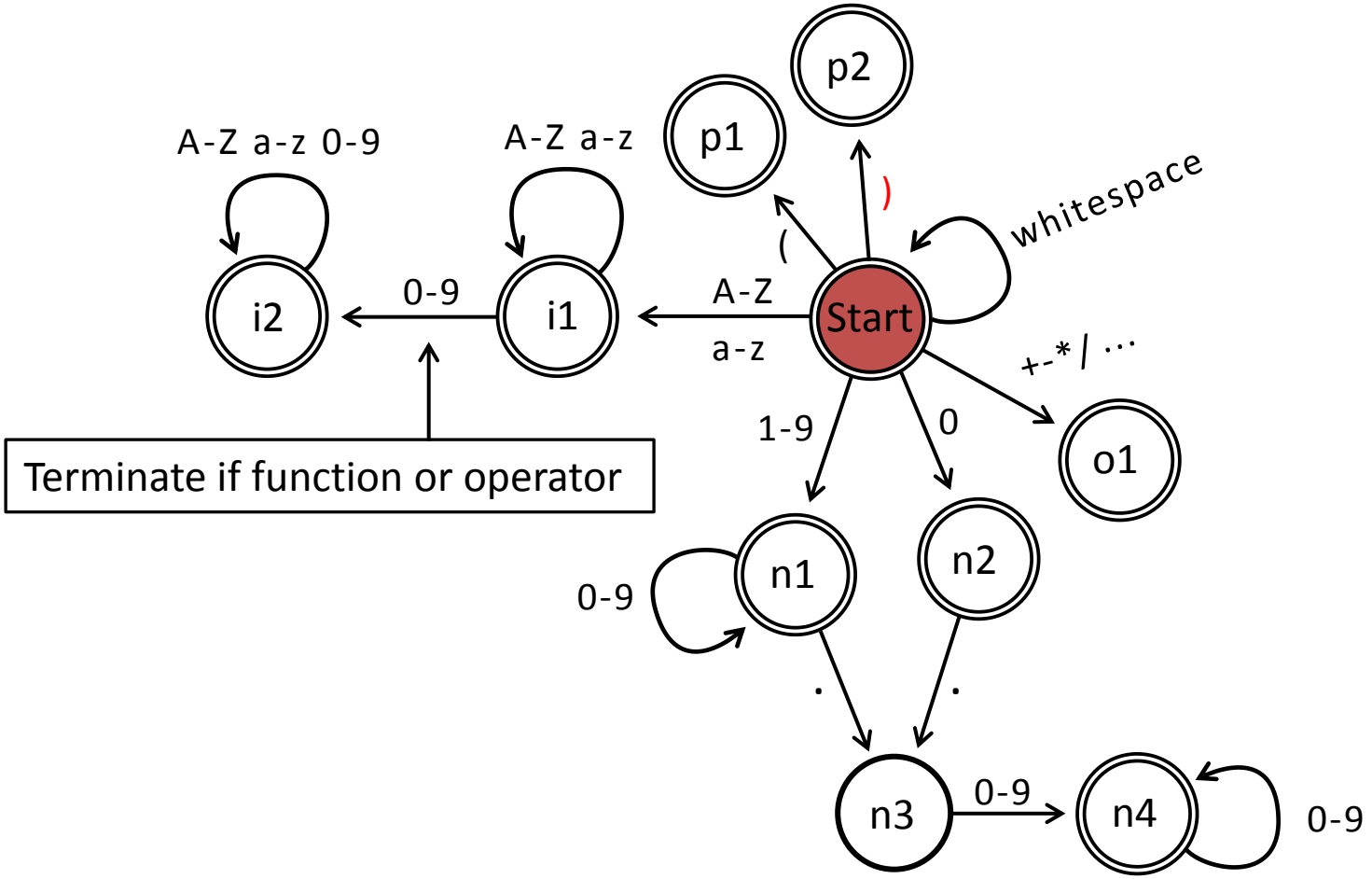
x1	=	-	1.6	*	cos	(	P

x1 = -1.6 * cos(Pi)



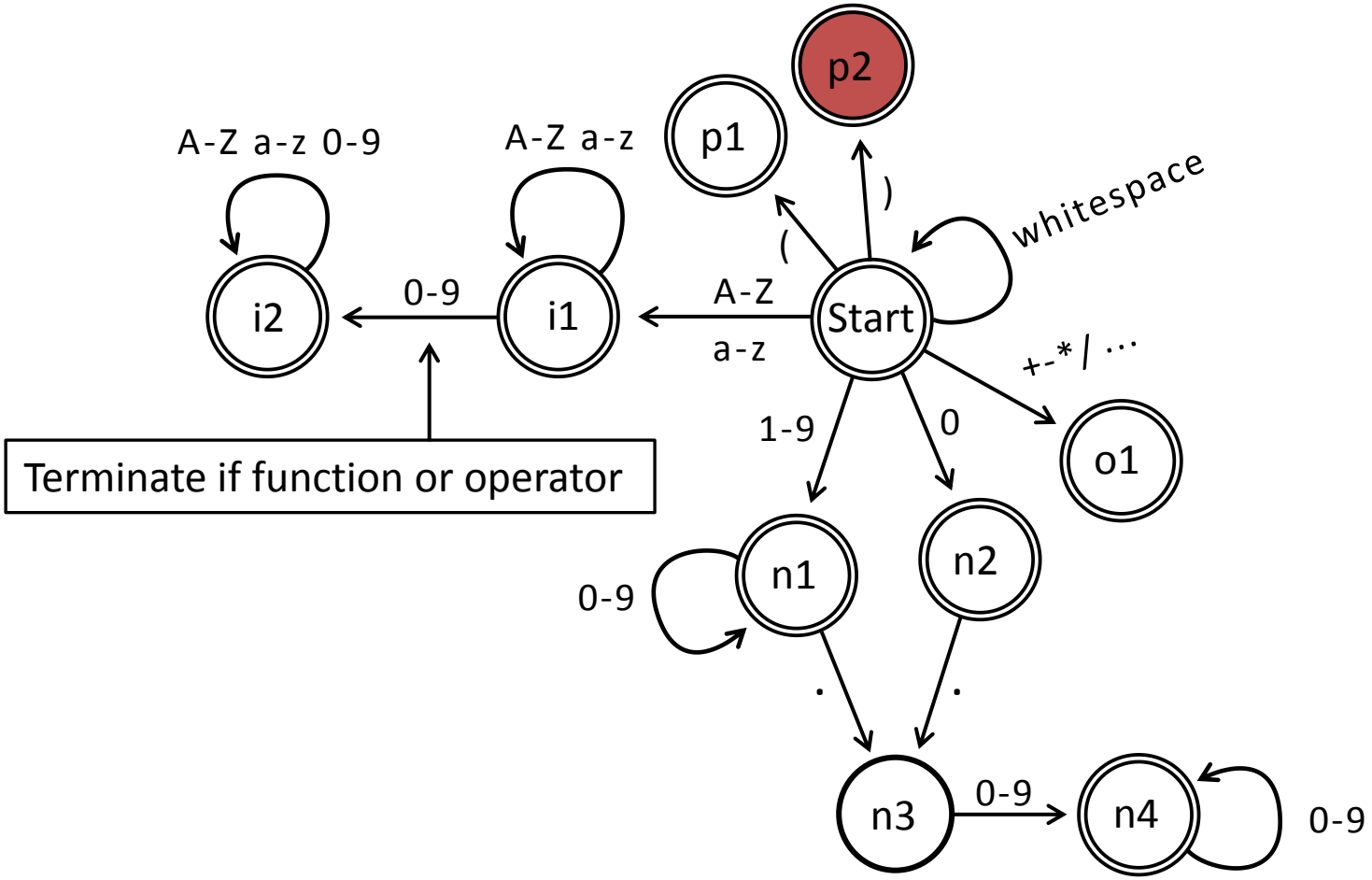
x1	=	-	1.6	*	cos	(	Pi

x1 = -1.6 * cos(Pi)



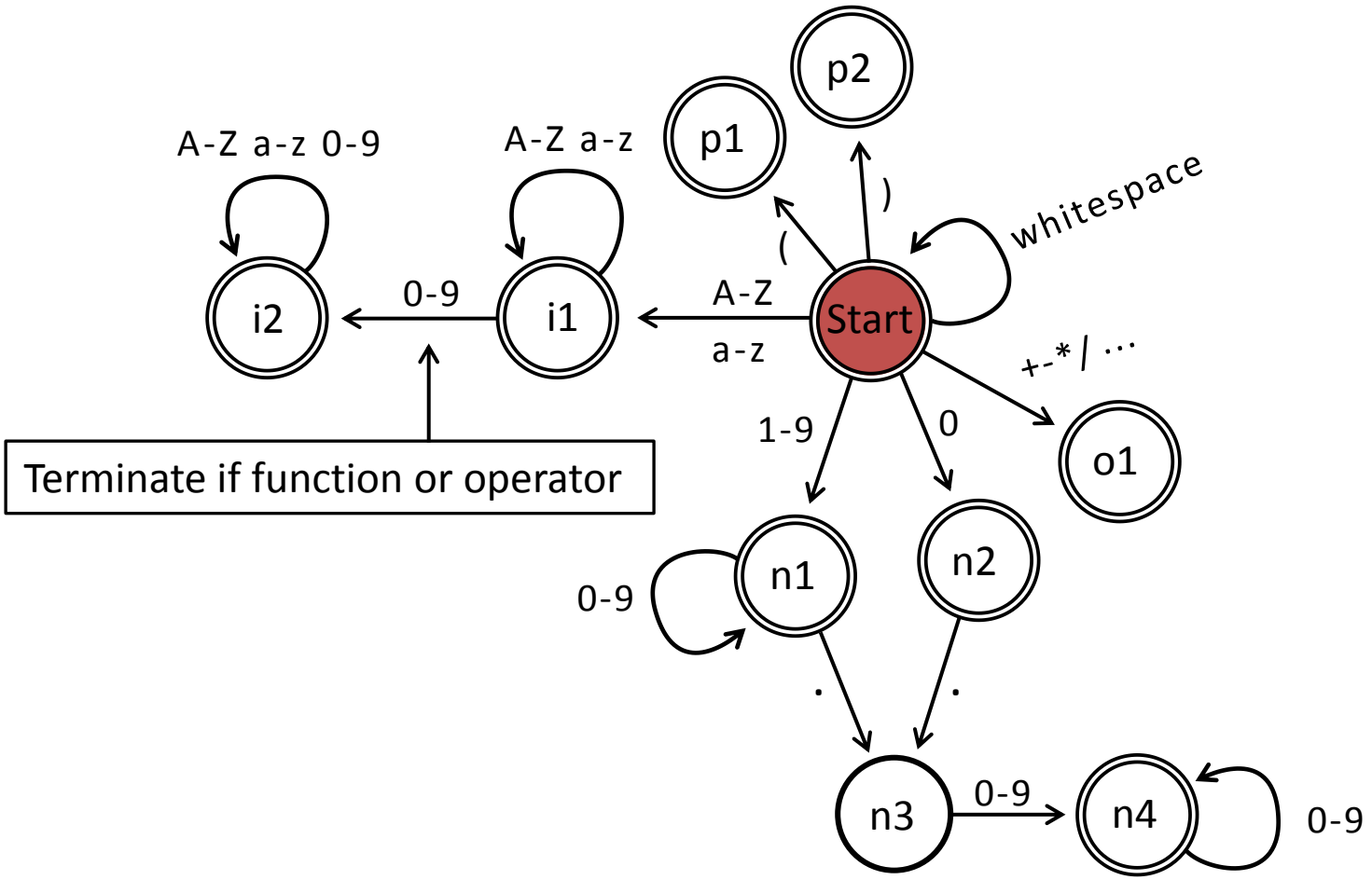
x1	=	-	1.6	*	cos	(	Pi

x1 = -1.6 * cos(Pi)



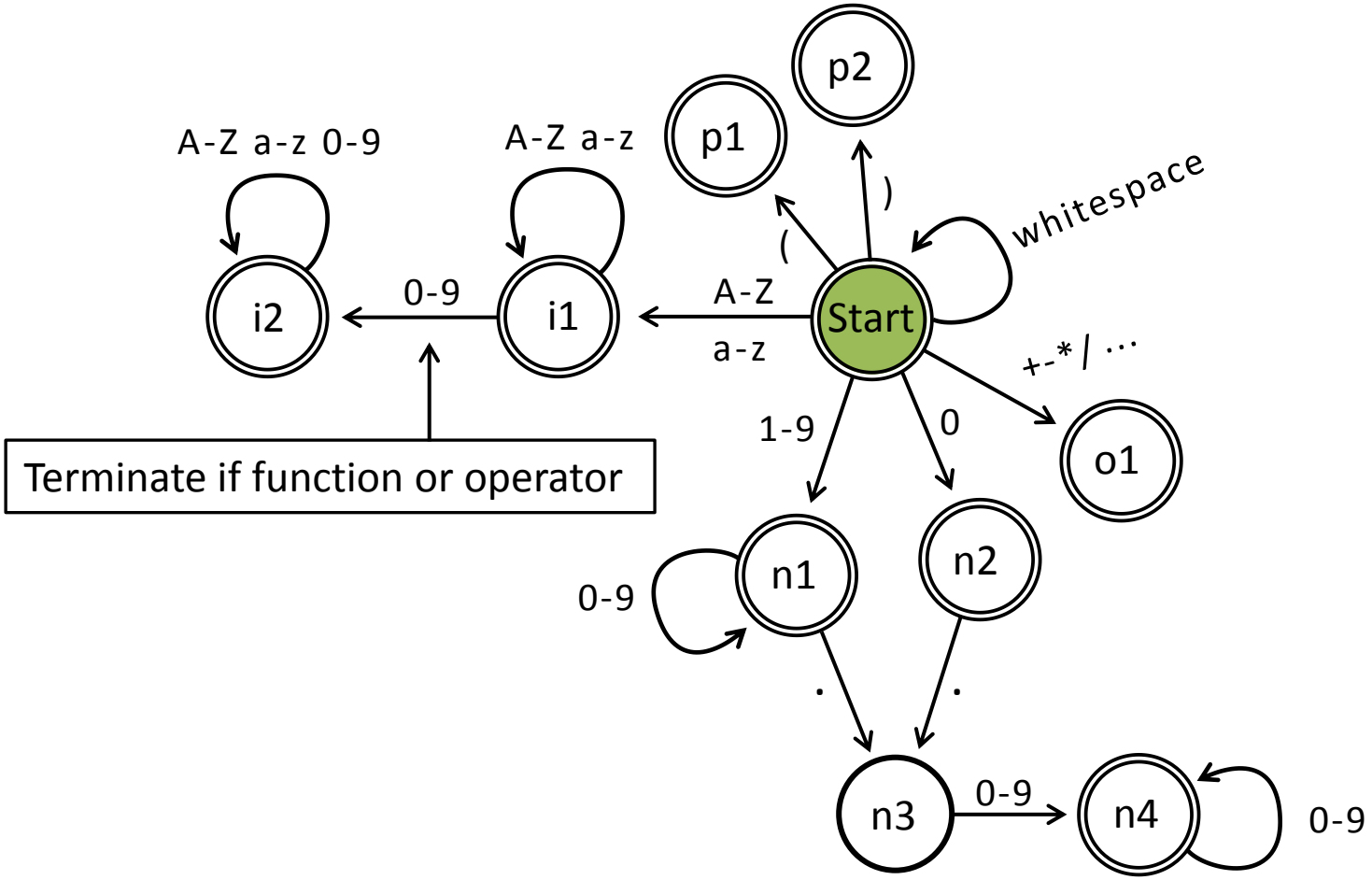
x1	=	-	1.6	*	cos	(	Pi	)

x1 = -1.6 * cos(Pi)



x1	=	-	1.6	*	cos	(	Pi	)

x1 = -1.6 * cos(Pi)



x1	=	-	1.6	*	cos	(	Pi	)

Validate

A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)

A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)

A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)

A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)

A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)

A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)

A

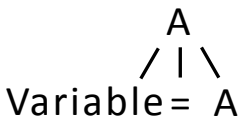
x1	=	-	1.6	*	cos	(	Pi	)
↑								

A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)



x1	=	-	1.6	*	cos	(	Pi	)

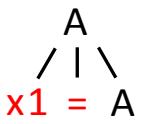
↑

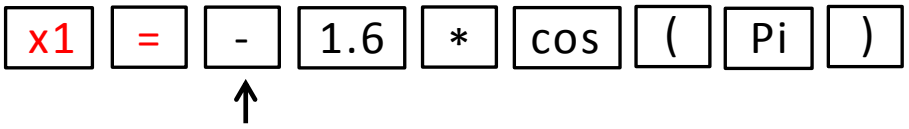
A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)



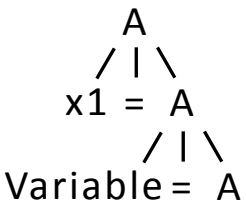


A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)



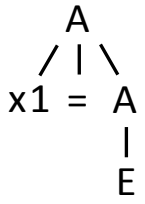
x1	=	-	1.6	*	cos	(	Pi	)
		↑						

A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)



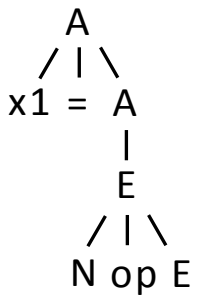
x1	=	-	1.6	*	cos	(	Pi	)
		↑						

A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)



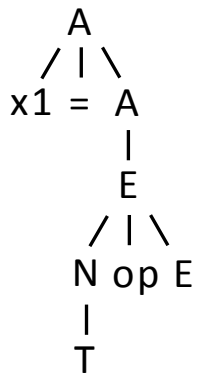
x1	=	-	1.6	*	cos	(	Pi	)
		↑						

A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)



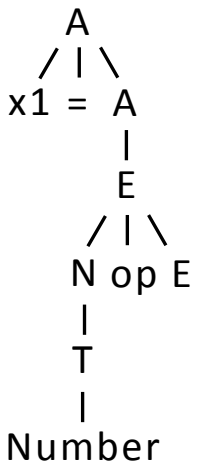
x1	=	-	1.6	*	cos	(	Pi	)
		↑						

A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)



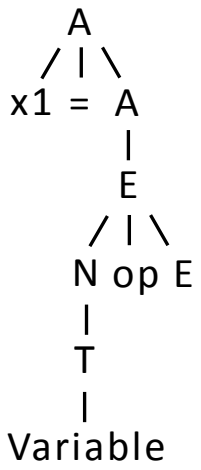
x1	=	-	1.6	*	cos	(	Pi	)
		↑						

A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)



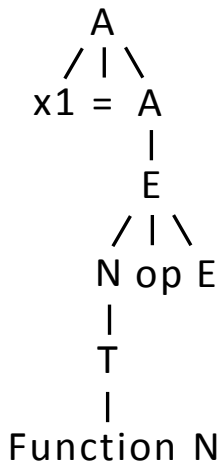
x1	=	-	1.6	*	cos	(	Pi	)
		↑						

A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)



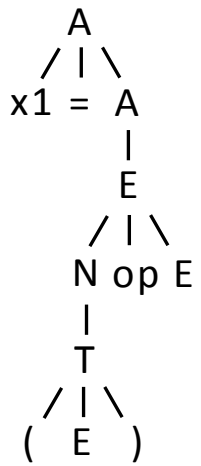
x1	=	-	1.6	*	cos	(	Pi	)

A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)



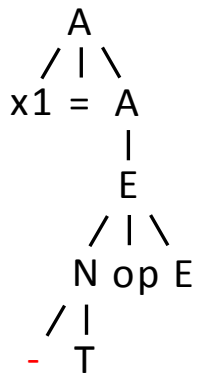
x1	=	-	1.6	*	cos	(	Pi	)
		↑						

A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)



x1	=	-	1.6	*	cos	(	Pi	)

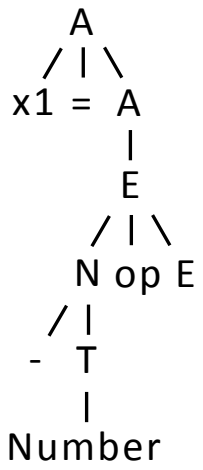
↑

A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)



x1	=	-	1.6	*	cos	(	Pi	)

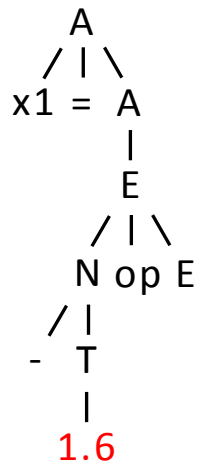
↑

A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)



x1	=	-	1.6	*	cos	(	Pi	)

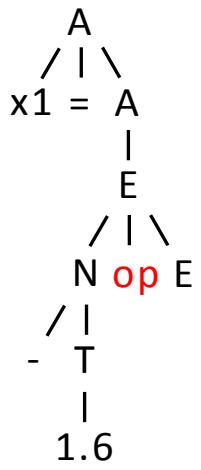
↑

A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)



x1	=	-	1.6	*	cos	(	Pi	)

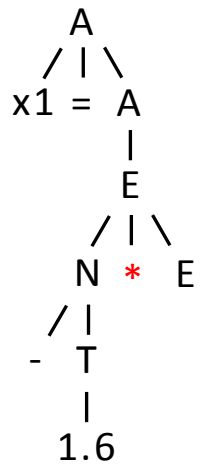
↑

A → Variable = A | E

E → N operator E | N

N → T | - T

T → Number | Variable | Function N | (E)



x1	=	-	1.6	*	cos	(	Pi	)

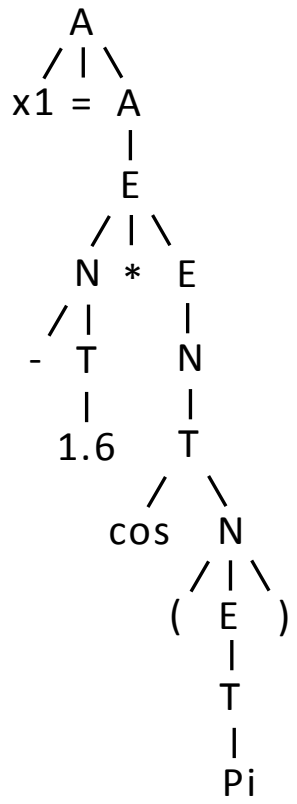
↑

A → Variable = A | E

E → N operator E | N

N → T | - T

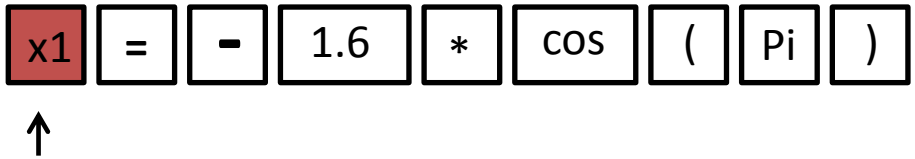
T → Number | Variable | Function N | (E)

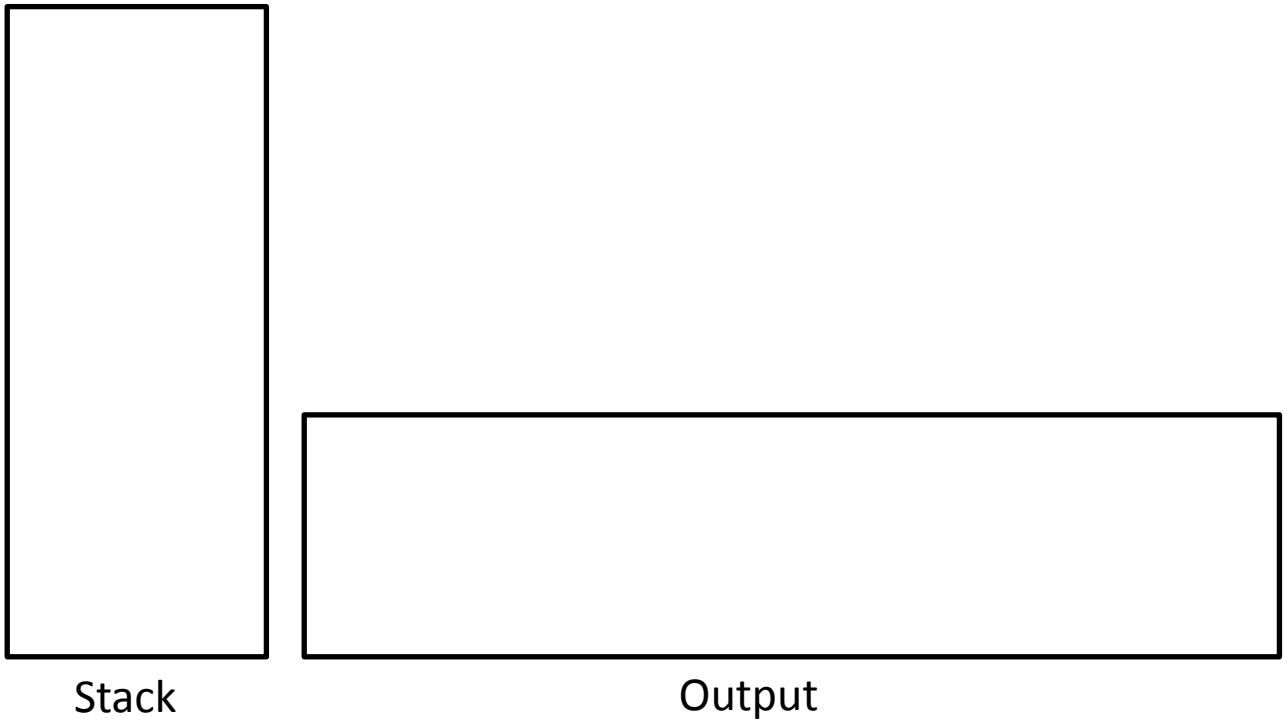


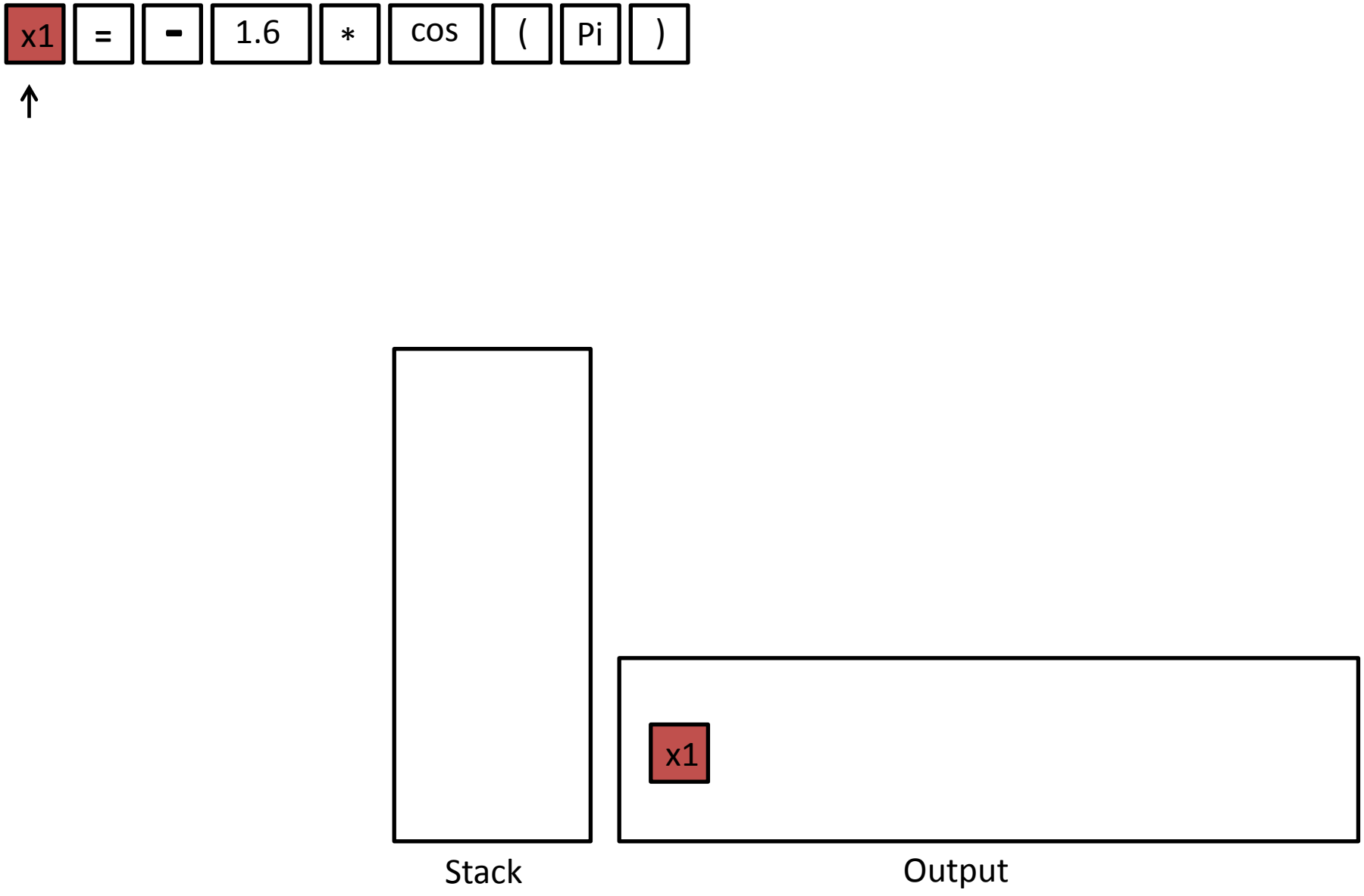
x1	=	-	1.6	*	cos	(	Pi	)

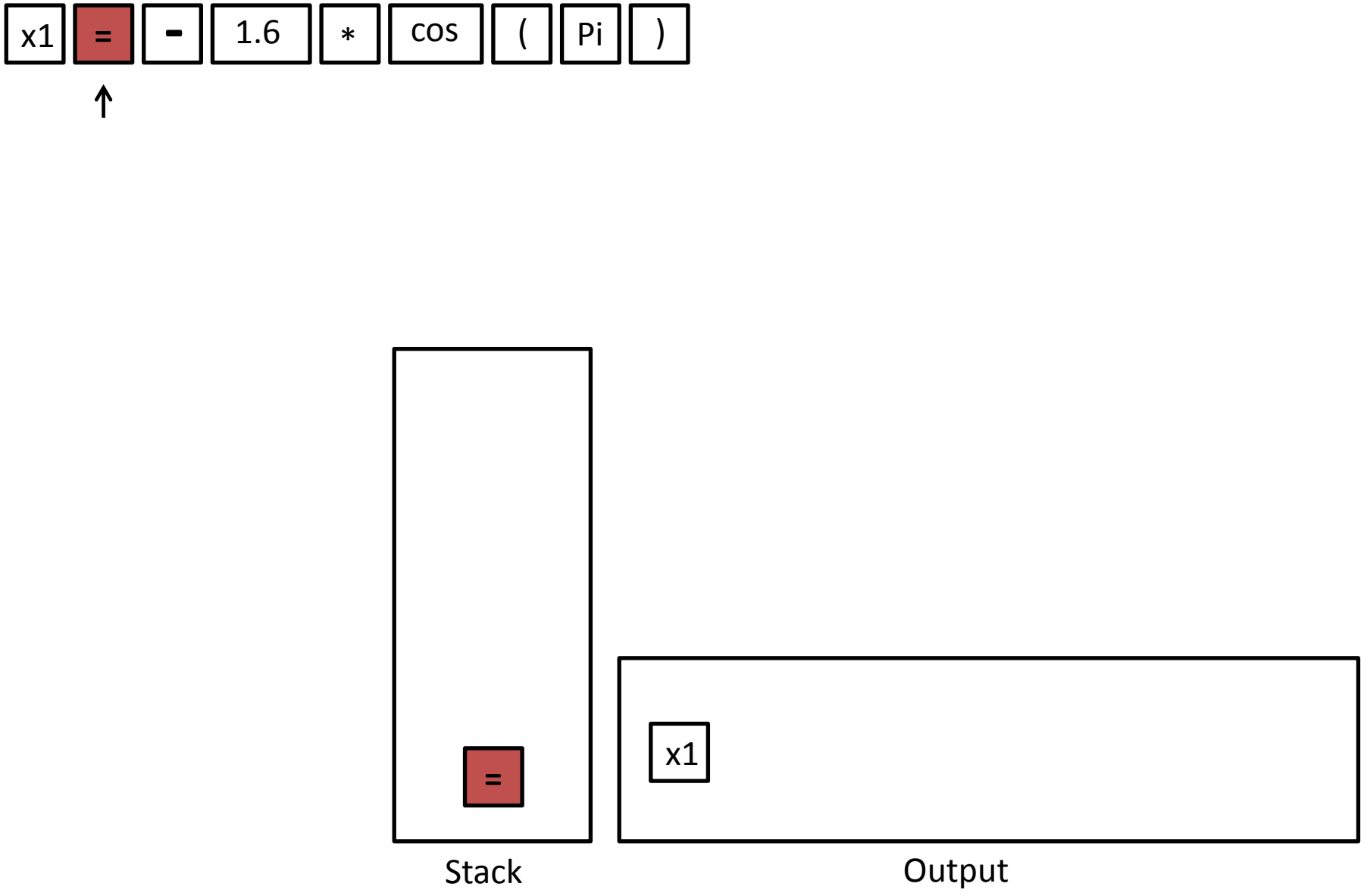
↑

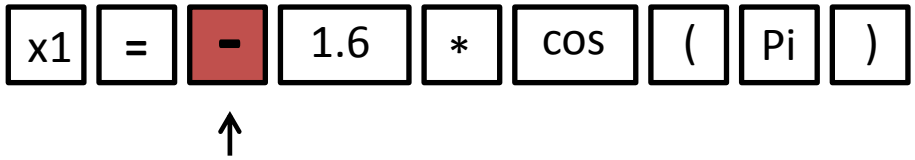
Translate

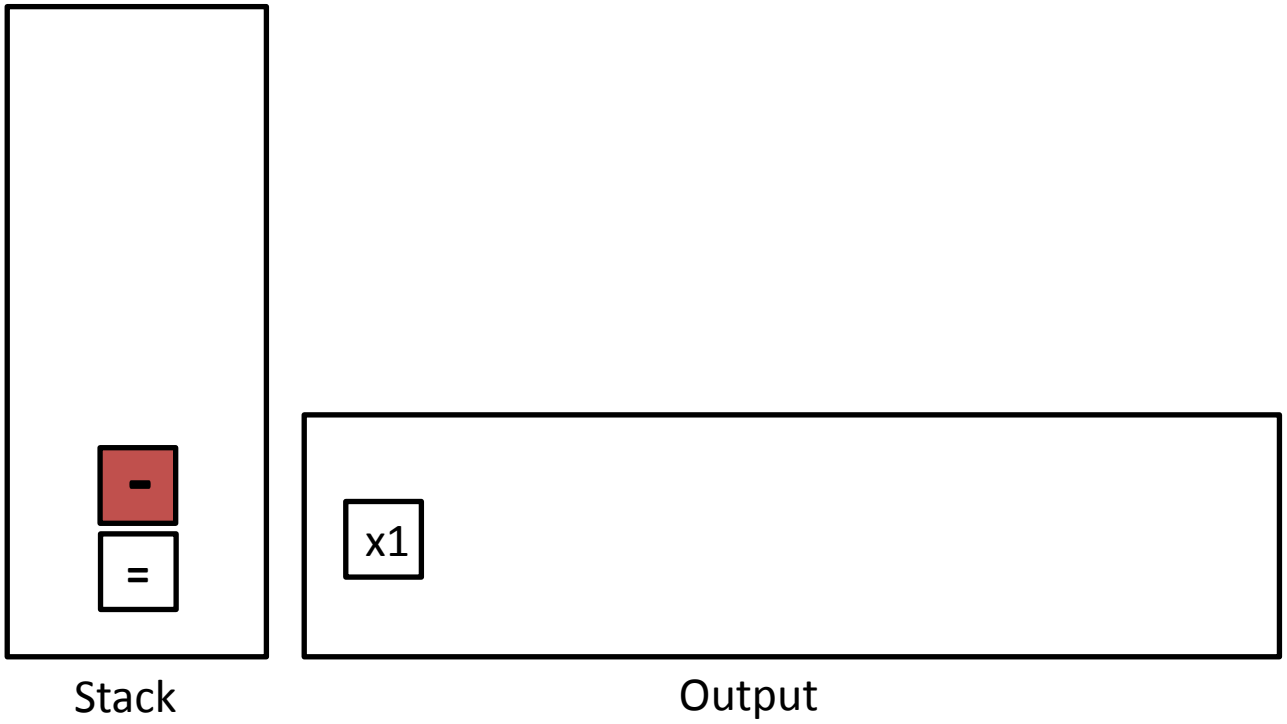

x1
=
-
1.6
*
cos
(
Pi
)

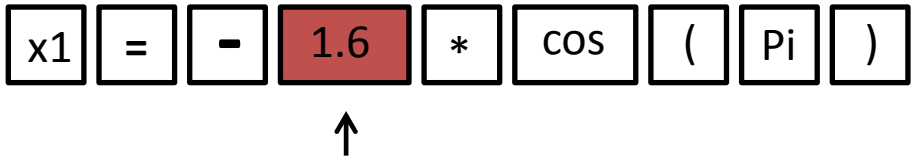

Stack
Output

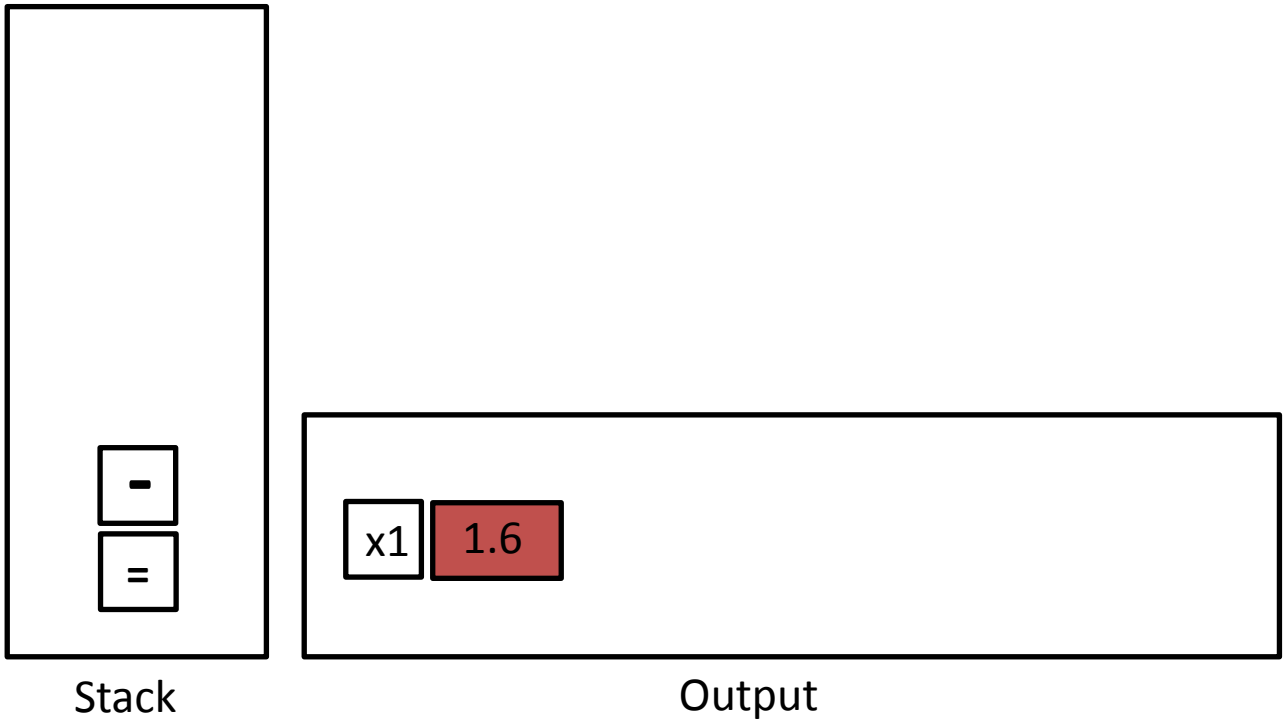

x1
=
-
1.6
*
cos
(
Pi
)
x1
Stack
Output

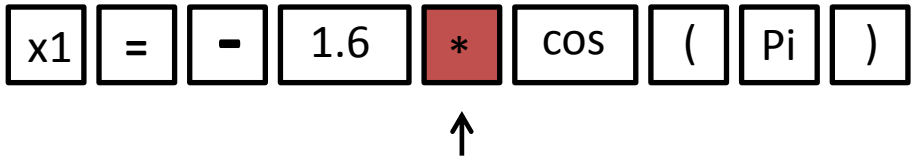

x1
=
-
1.6
*
cos
(
Pi
)
=
x1
Stack
Output

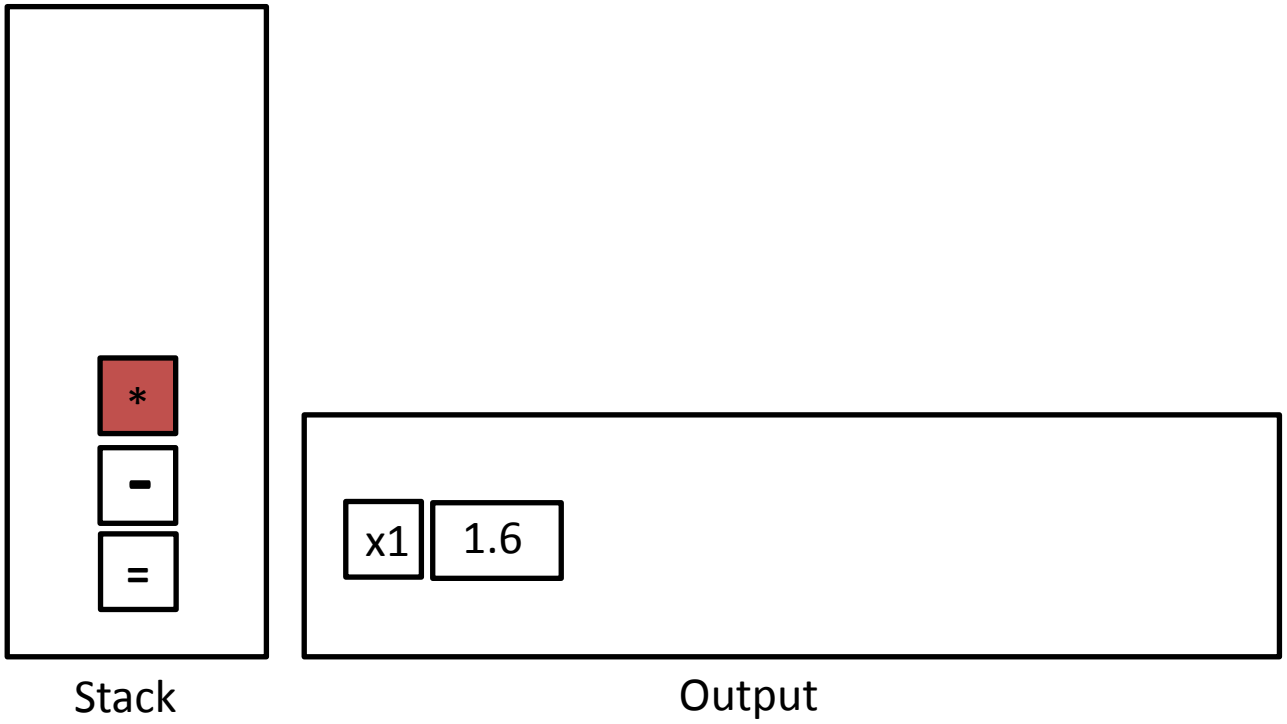

x1
=
-
1.6
*
cos
(
Pi
)

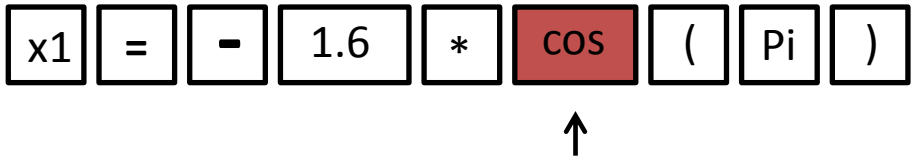

-
=
x1
Stack
Output

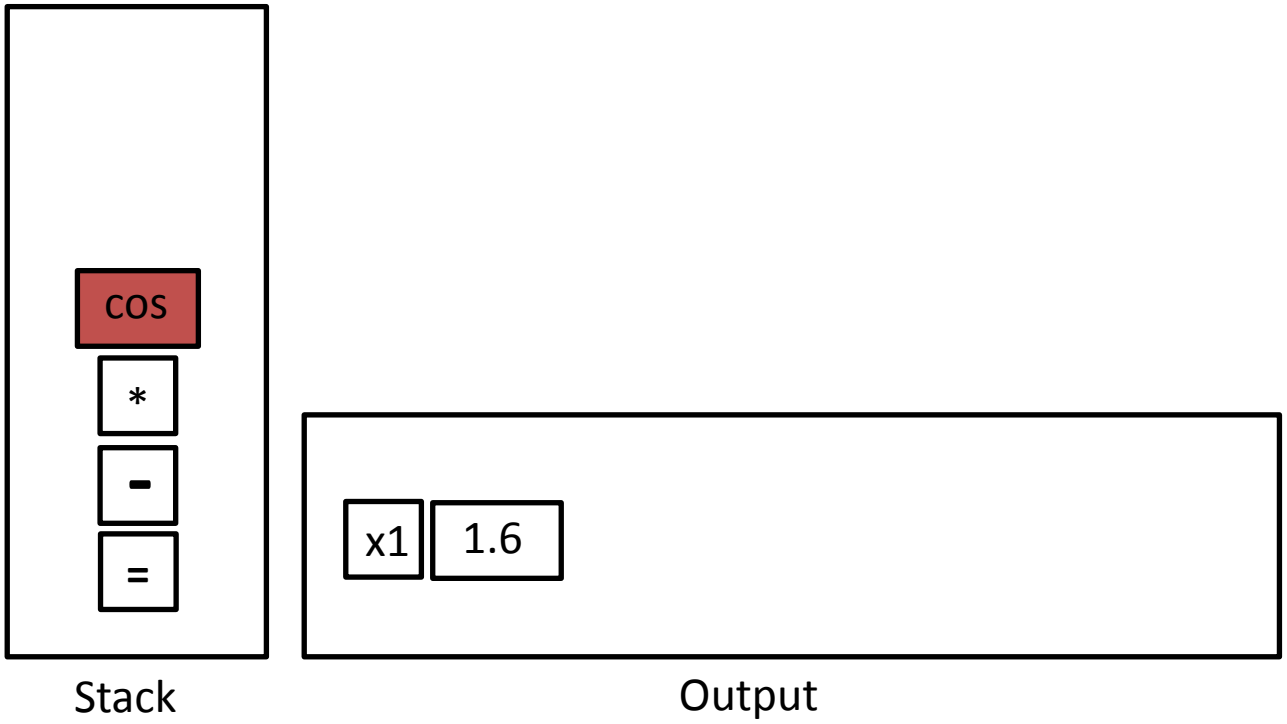

x1
=
-
1.6
*
cos
(
Pi
)

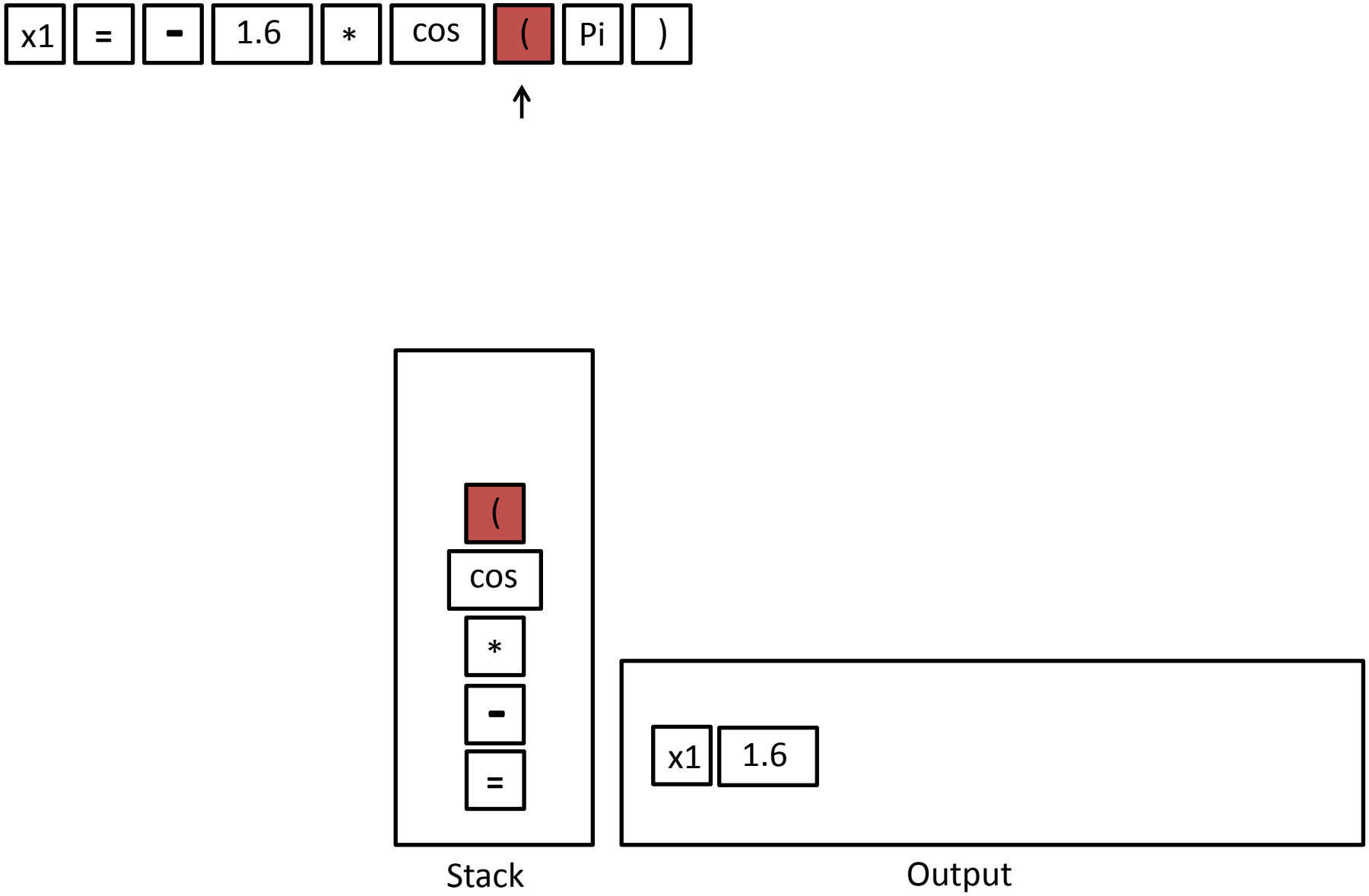

-
=
x1
1.6
Stack
Output

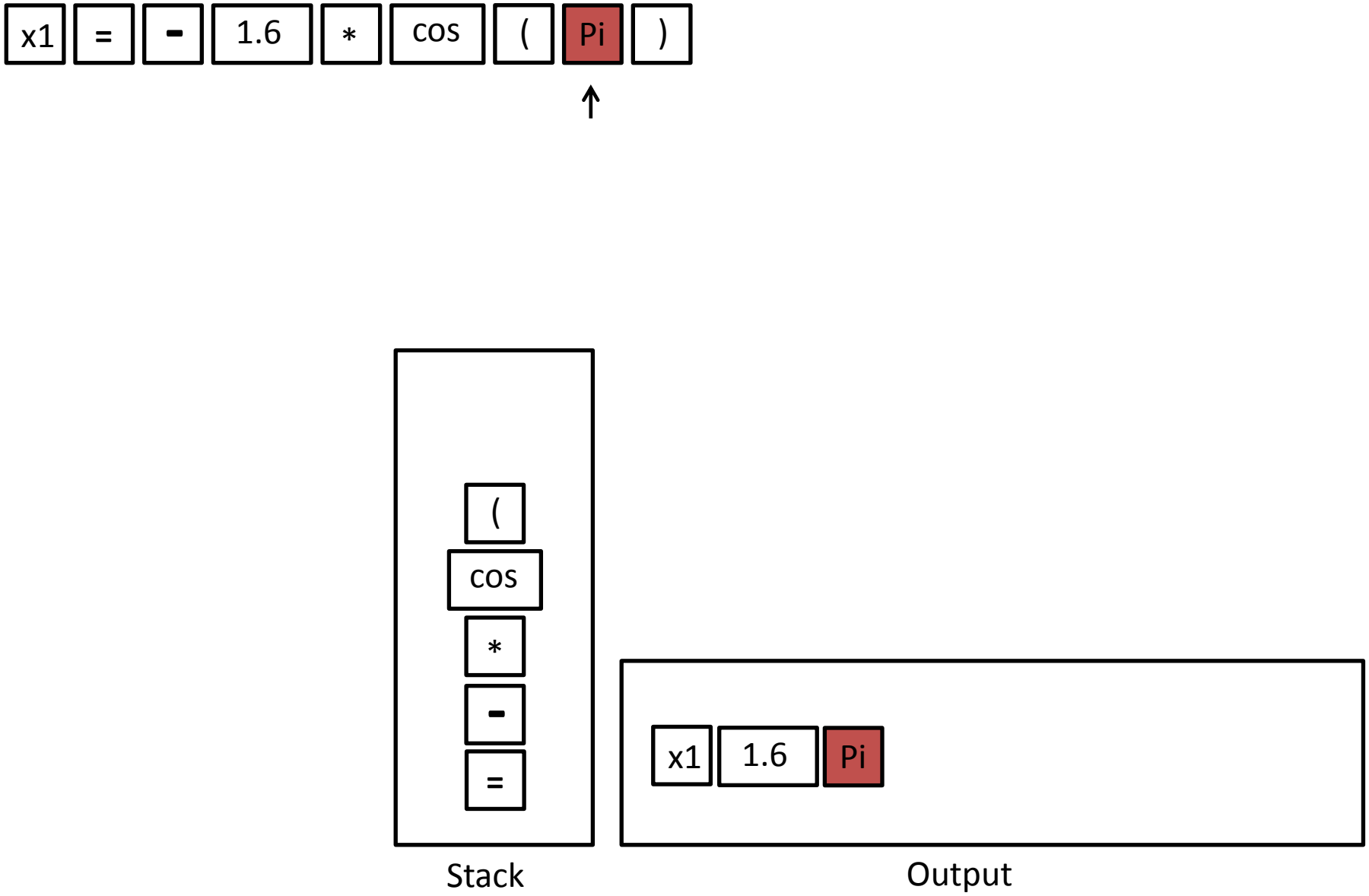

x1
=
-
1.6
*
cos
(
Pi
)

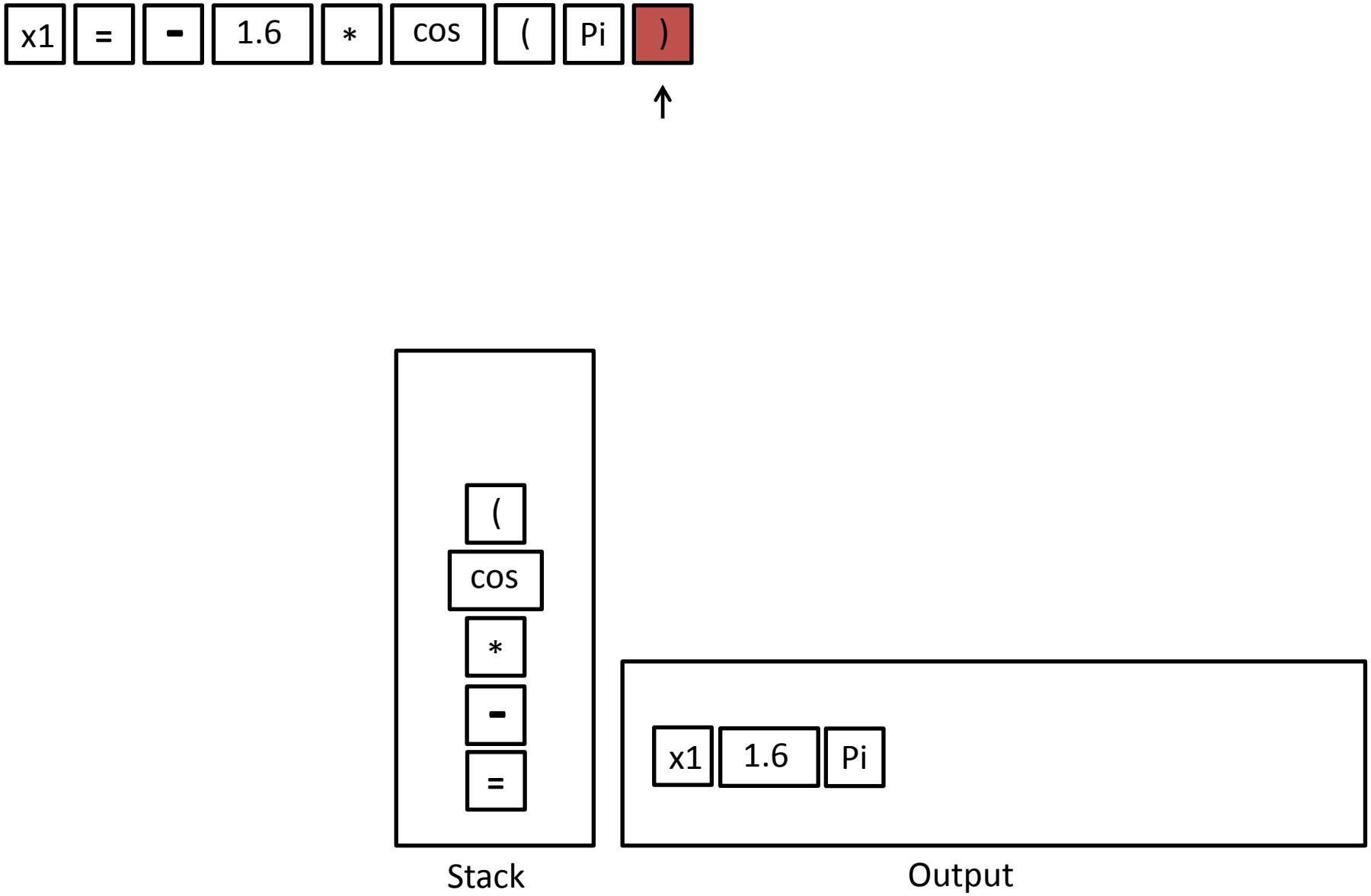

*
-
=
x1
1.6
Stack
Output

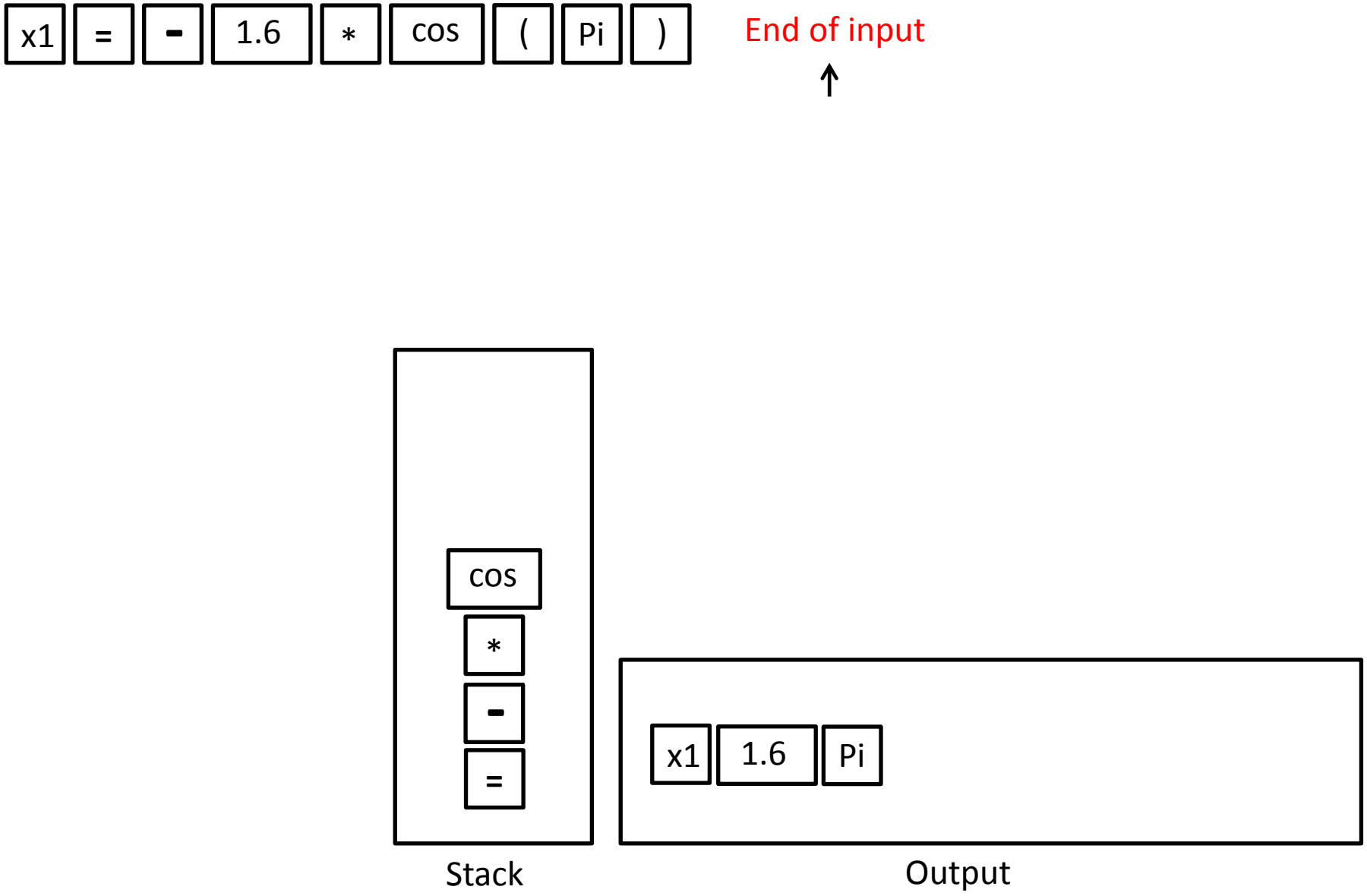

x1
=
-
1.6
*
cos
(
Pi
)

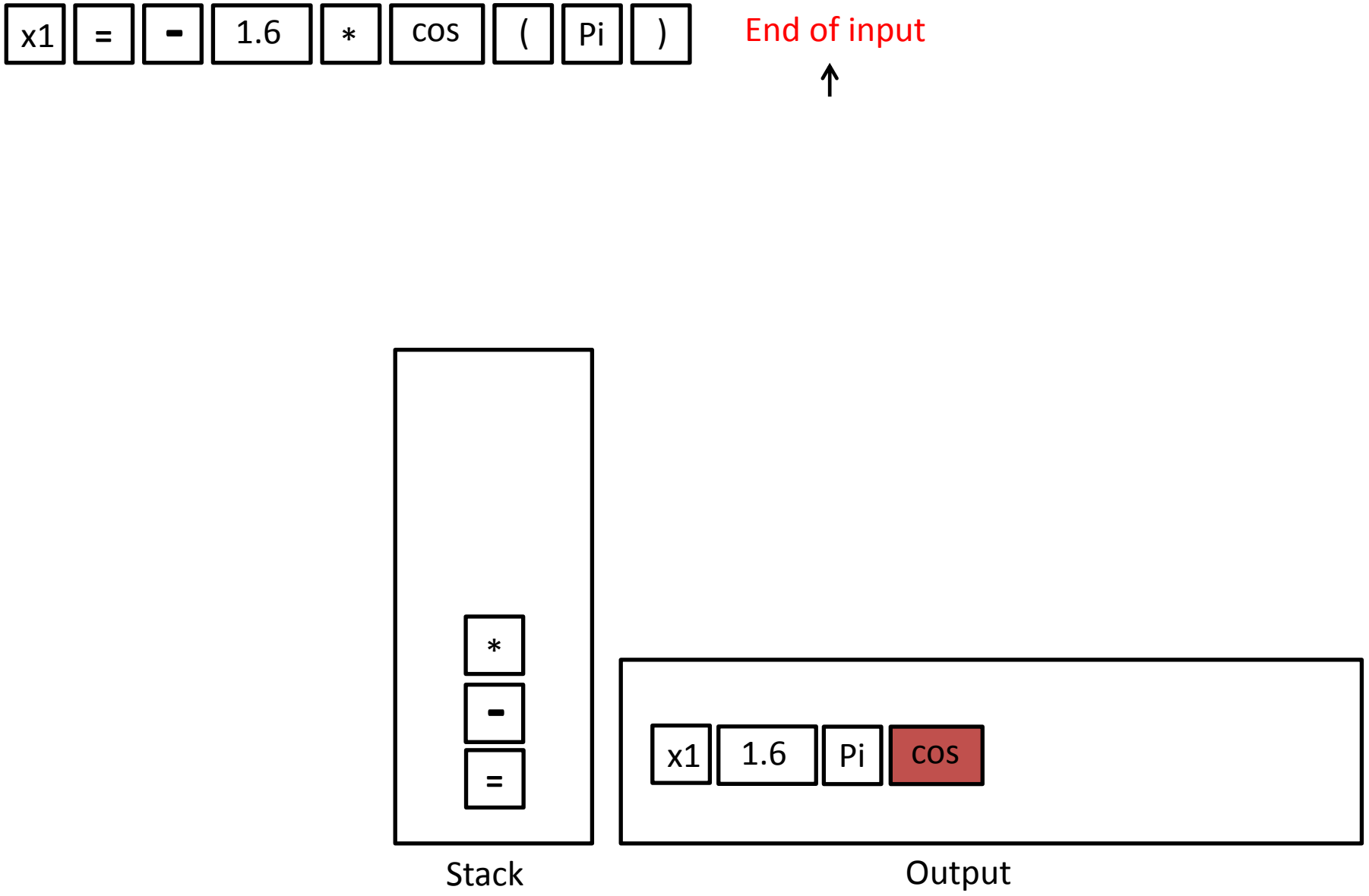

cos
*
-
=
x1
1.6
Stack
Output

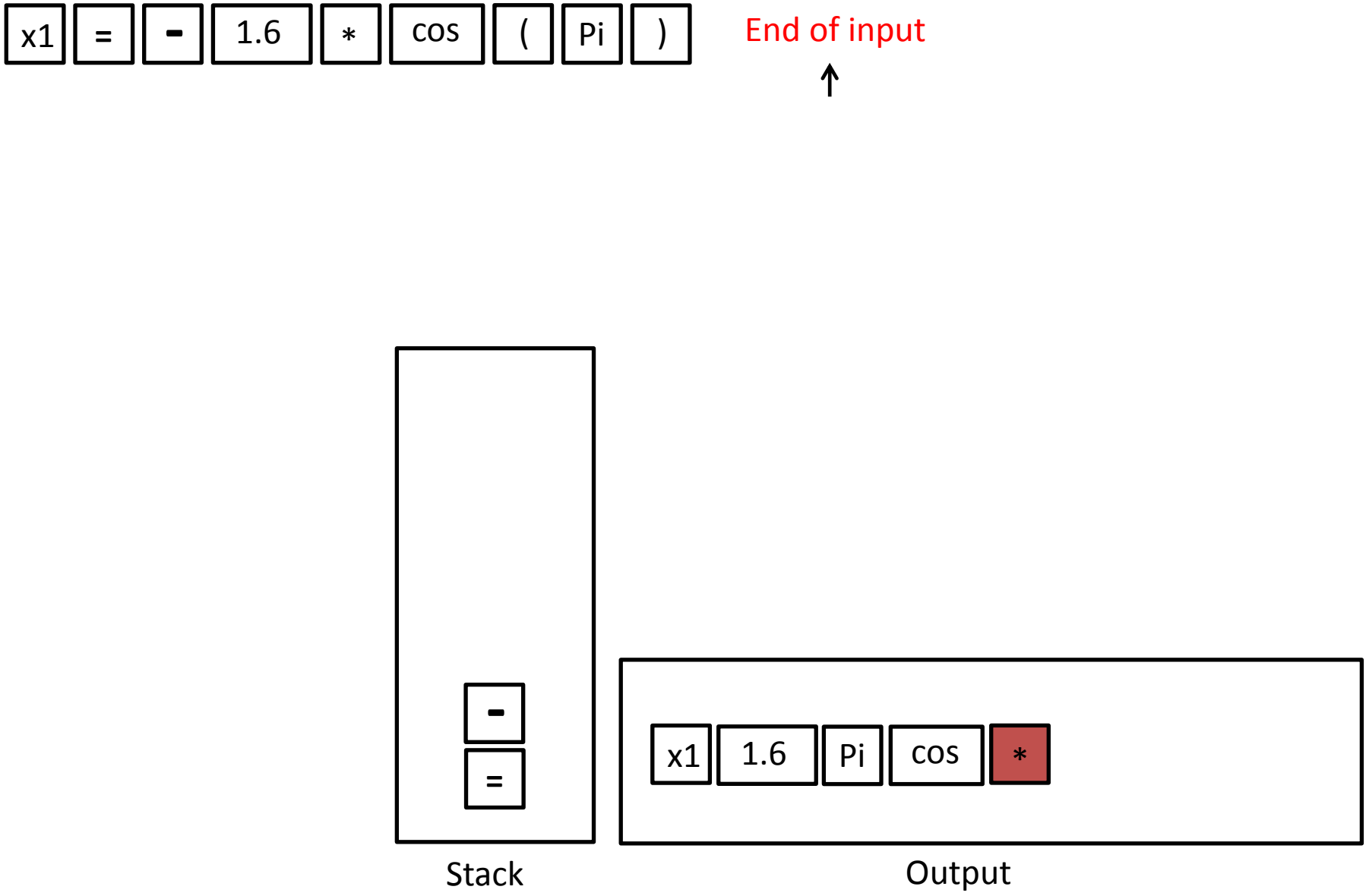

x1
=
-
1.6
*
cos
(
Pi
)
(
cos
*
-
=
x1
1.6
Stack
Output

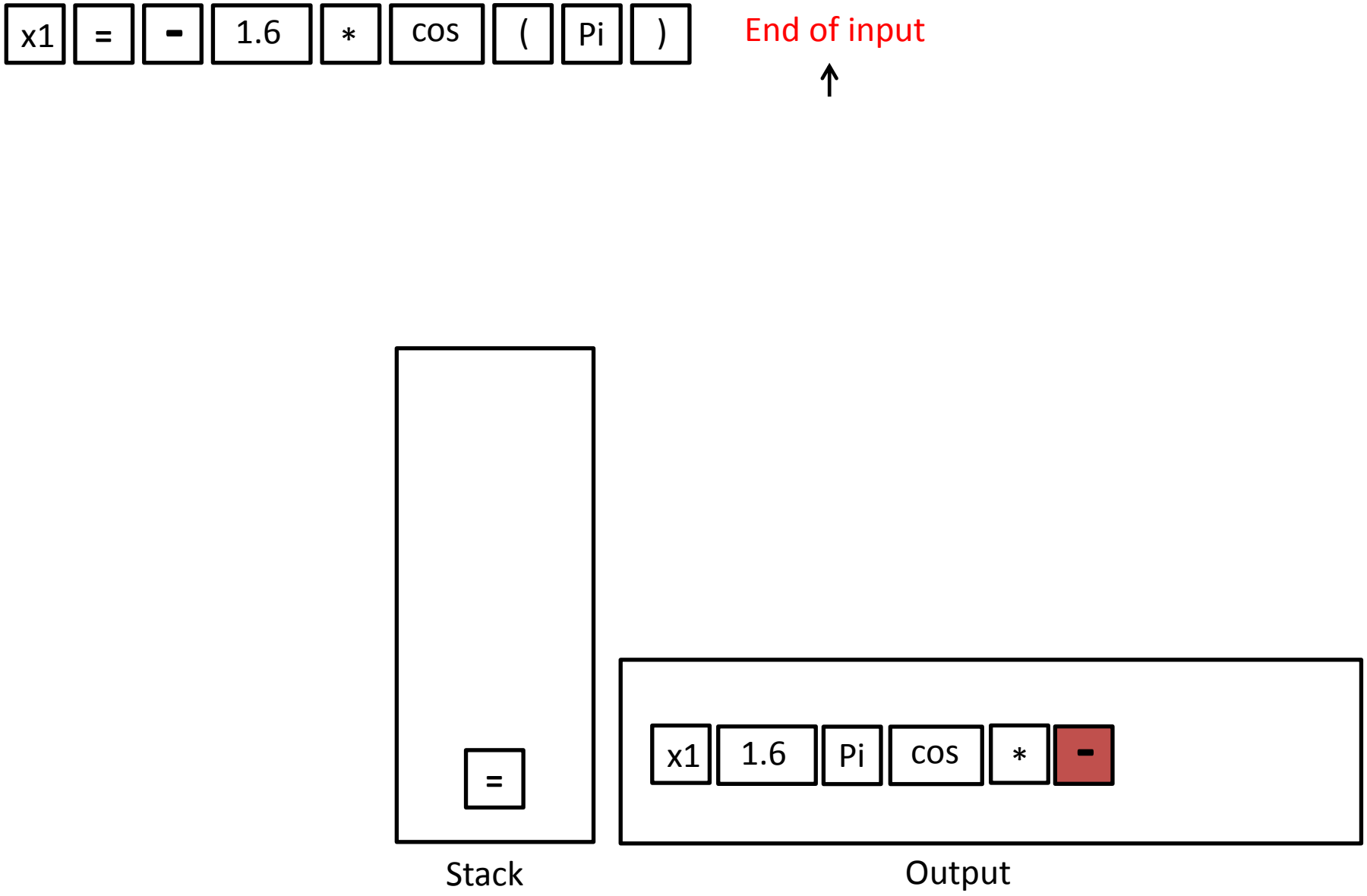

x1
=
-
1.6
*
cos
(
Pi
)
(
cos
*
-
=
x1
1.6
Pi
Stack
Output

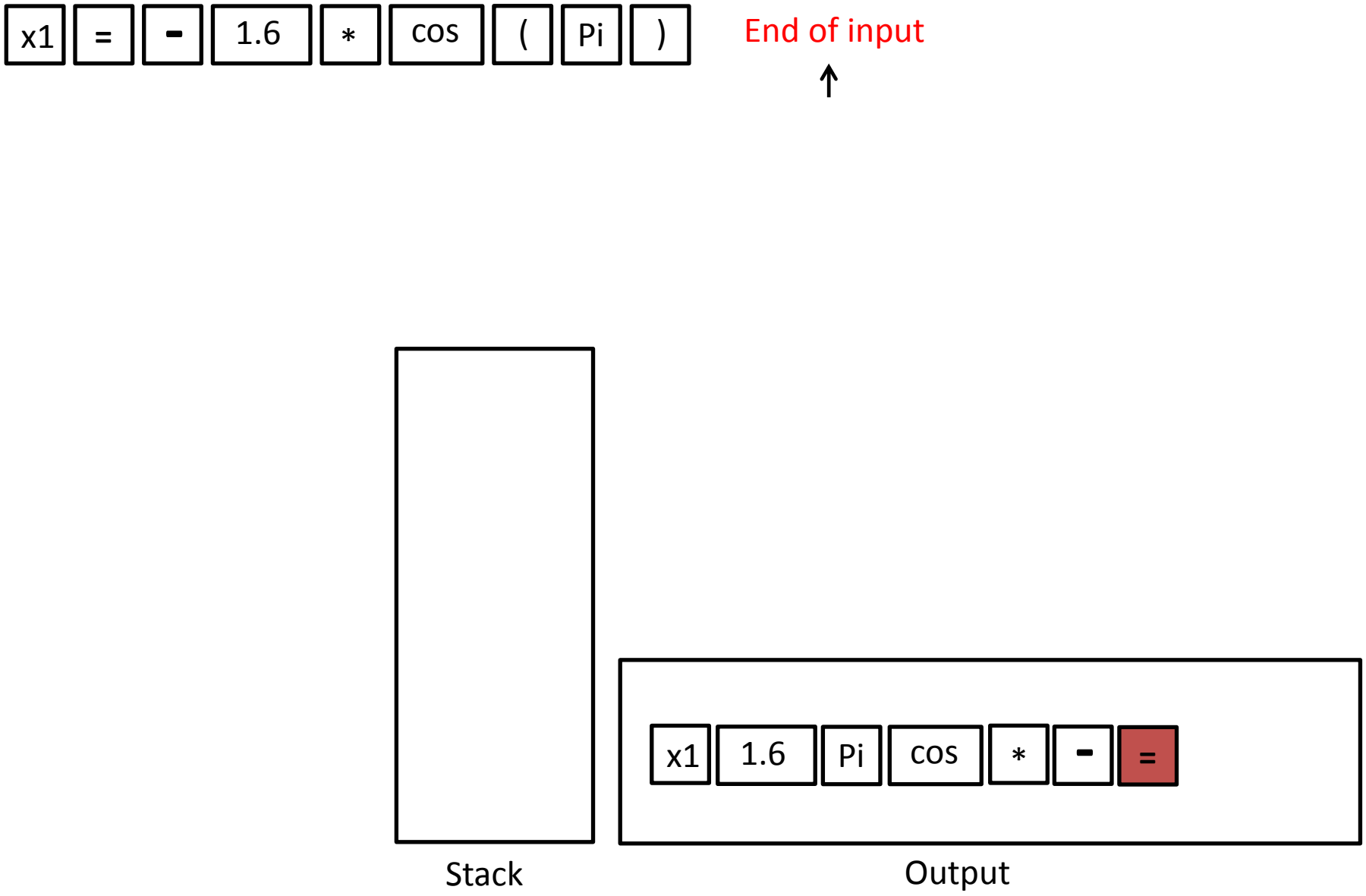

x1
=
-
1.6
*
cos
(
Pi
)
(
cos
*
-
=
x1
1.6
Pi
Stack
Output

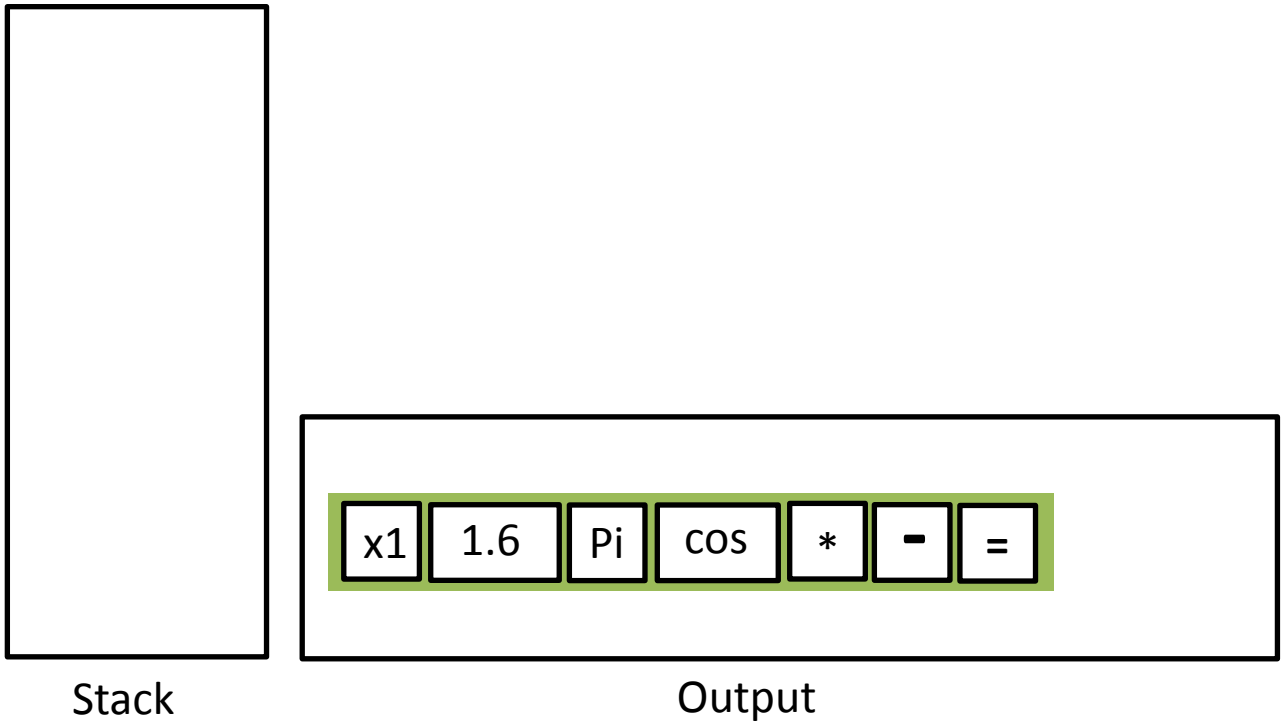

x1
=
-
1.6
*
cos
(
Pi
)
End of input
cos
*
-
=
x1
1.6
Pi
Stack
Output


x1
=
-
1.6
*
cos
(
Pi
)
End of input
*
-
=
x1
1.6
Pi
cos
Stack
Output

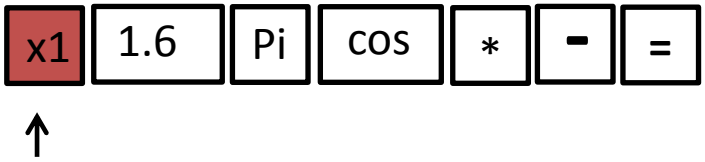

x1
=
-
1.6
*
cos
(
Pi
)
End of input
-
=
Stack
x1
1.6
Pi
cos
*
Output

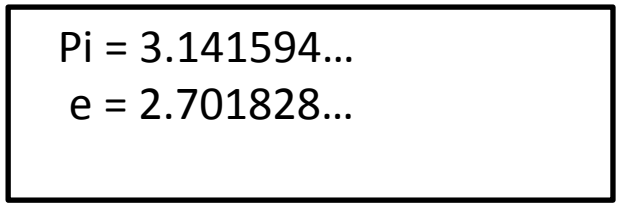

x1
=
-
1.6
*
cos
(
Pi
)
End of input
=
Stack
x1
1.6
Pi
cos
*
-
Output


x1
=
-
1.6
*
cos
(
Pi
)
End of input
x1
1.6
Pi
cos
*
-
=
Stack
Output

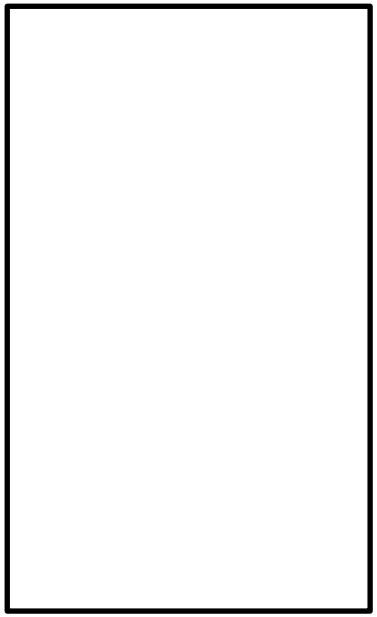

x1
1.6
Pi
cos
*
-
=
Stack
Output

Evaluate

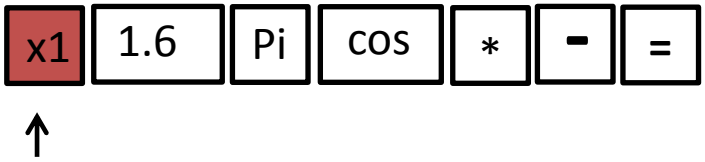




Enviroment

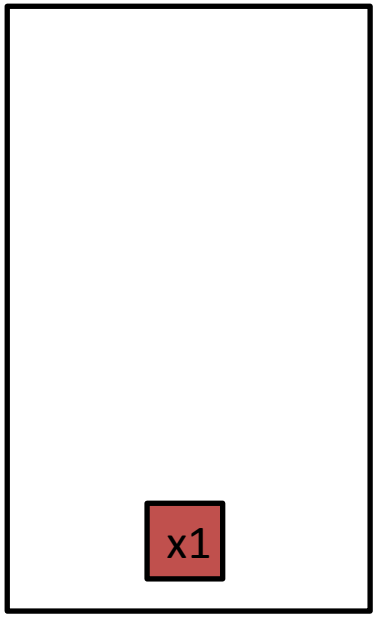


Stack

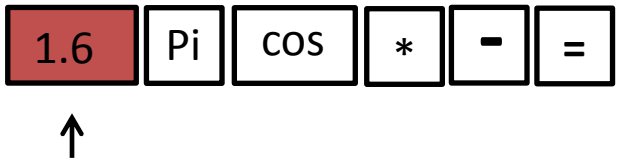


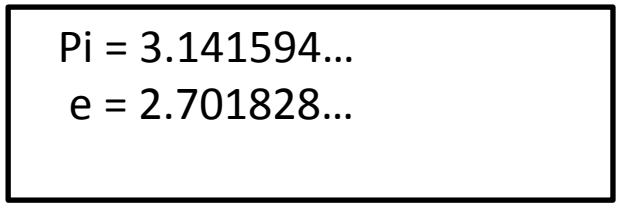
Pi = 3.141594…
e = 2.701828…

Enviroment

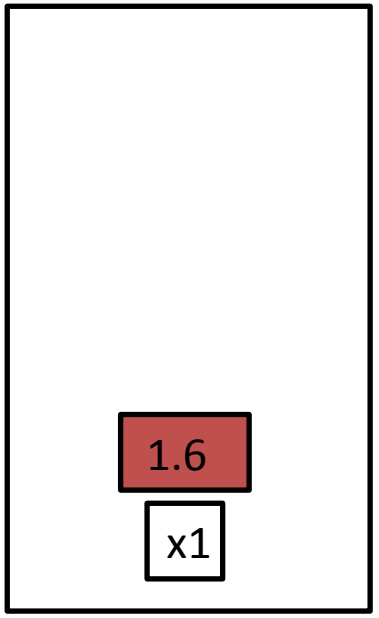


Stack

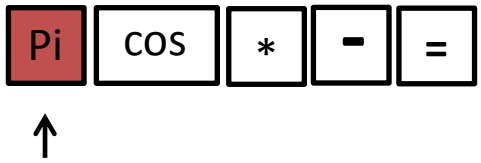




Enviroment

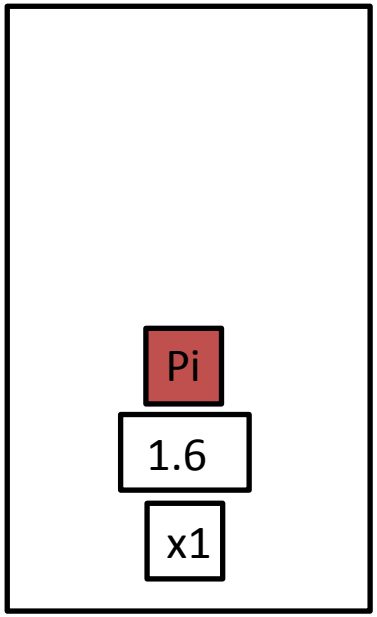


Stack

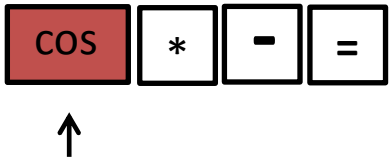


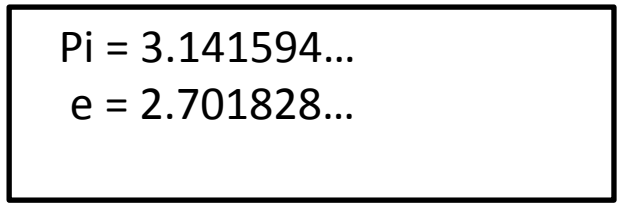
Pi = 3.141594…
e = 2.701828…

Enviroment

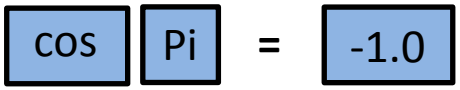


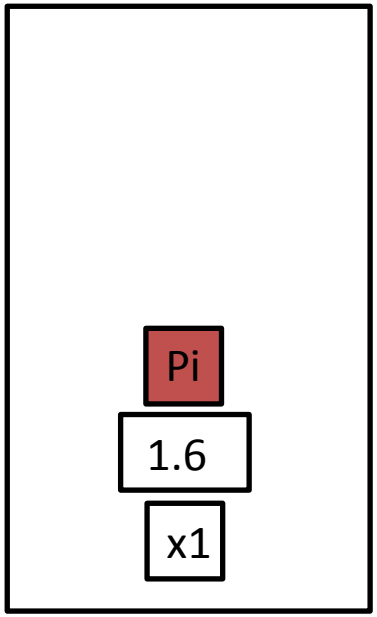
Stack



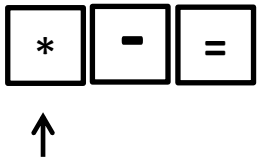


Enviroment



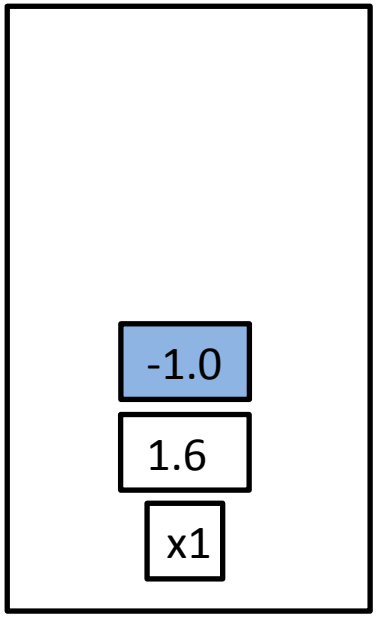


Stack

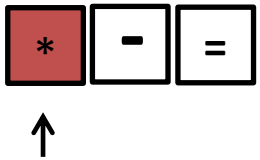


Pi = 3.141594…
e = 2.701828…

Enviroment

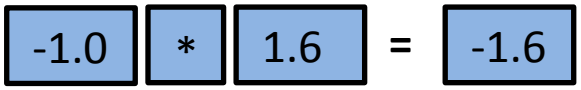


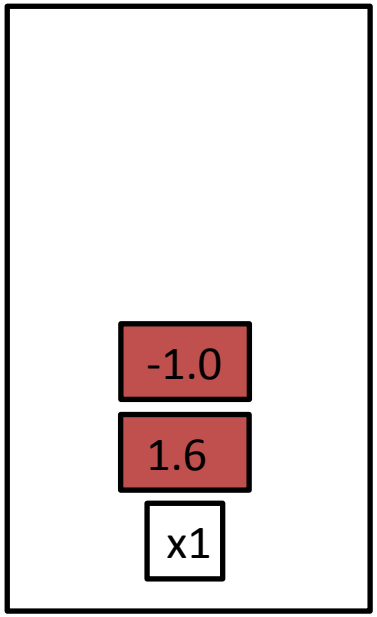
Stack



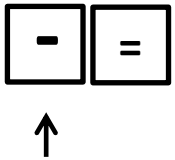
Pi = 3.141594…
e = 2.701828…

Enviroment



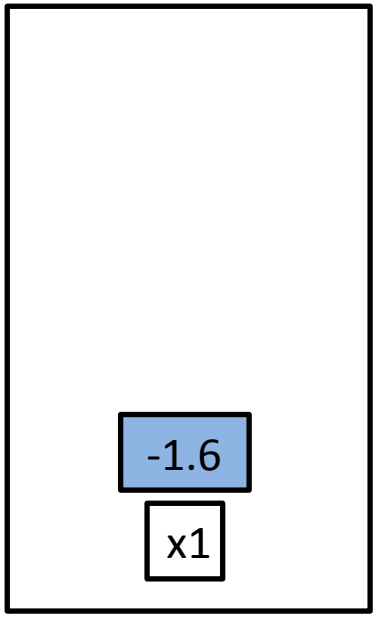


Stack

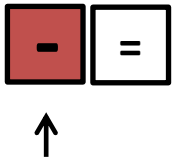


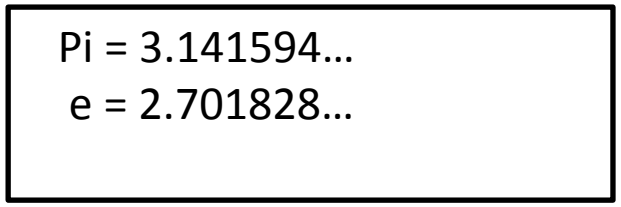
Pi = 3.141594…
e = 2.701828…

Enviroment

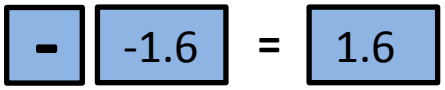


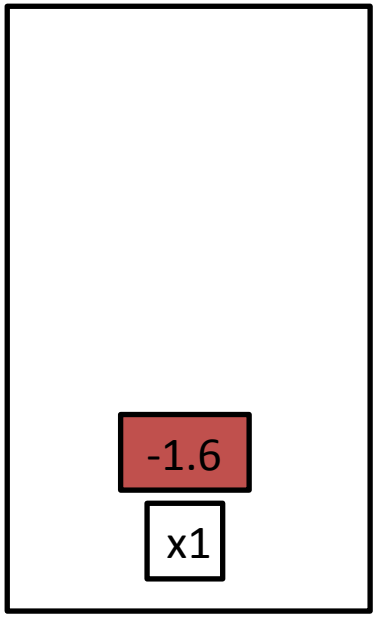
Stack



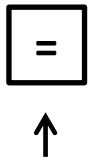


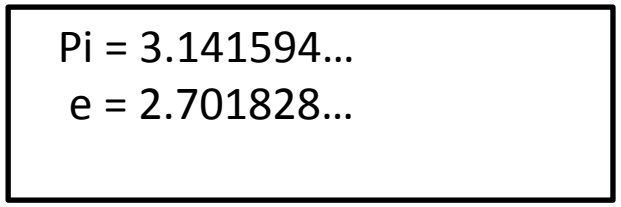
Enviroment



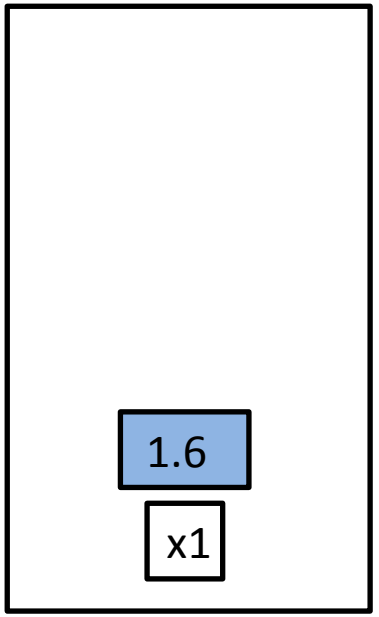


Stack





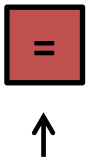
Enviroment

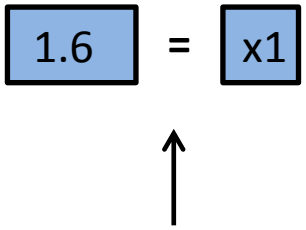


Stack

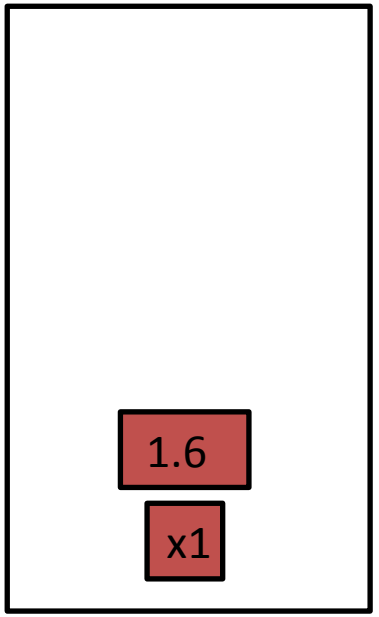
Pi = 3.141594…
e = 2.701828…

Enviroment

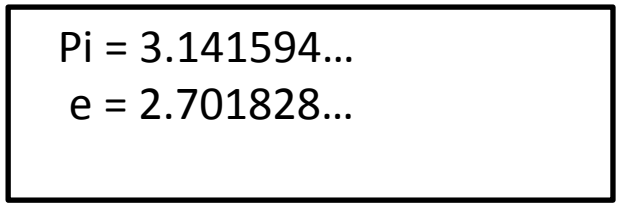




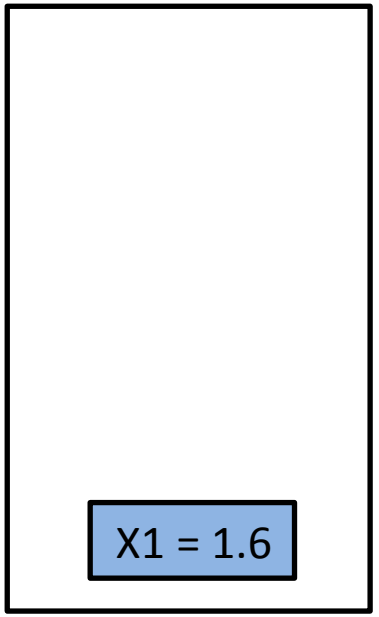
Assignment



Stack



Enviroment

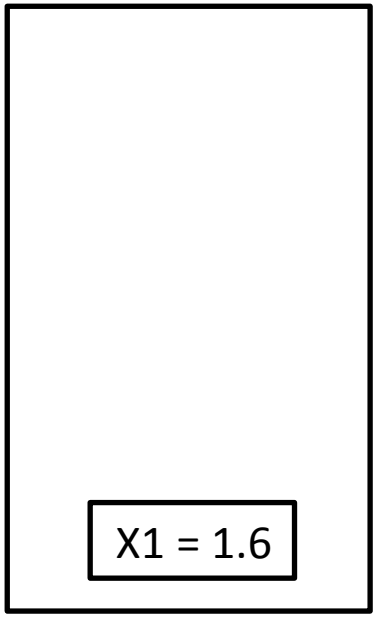


Stack

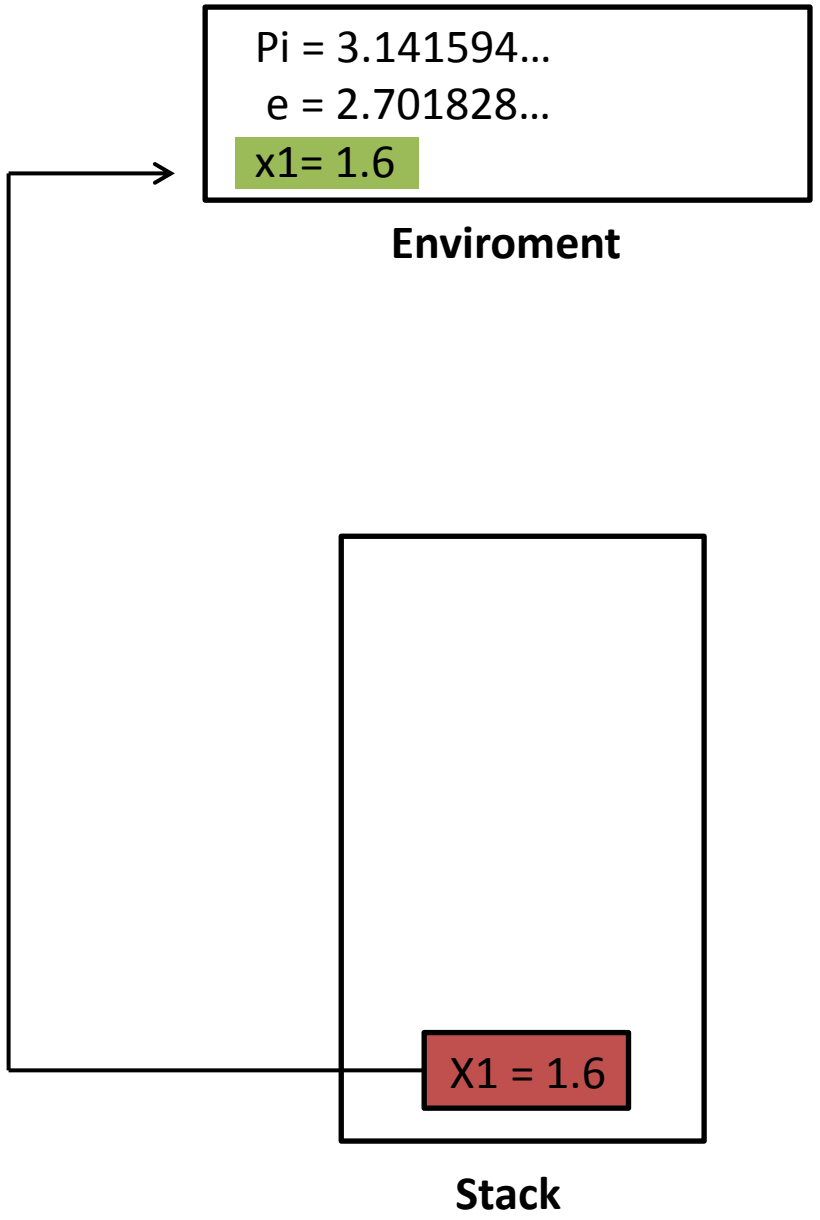
Pi = 3.141594…
e = 2.701828…

Enviroment

No more input.
Pop the top of the stack to the enviroment



Stack


Pi = 3.141594…
e = 2.701828…
x1= 1.6
Enviroment
X1 = 1.6
Stack

Pi = 3.141594…
e = 2.701828…
x1= 1.6

Enviroment

Done!

Stack

Demo

Questions