

Izjavne funkcije in dvojiška drevesa

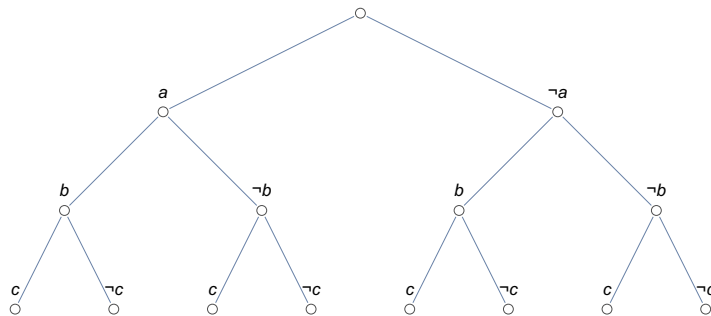
Izračunati moramo vrednost izjavne funkcije za vse možne nabore vrednosti spremenljivk. Vsaka pot od korena drevesa do t.i. listov je sestavljena iz spremenljivk ali njihovih negacij.

Spremenljivki x pripada vrednost $x = 1$ (resnica), negaciji spremenljivke, to je $\neg x$, pa $x = 0$ (neresnica). Vrednost funkcije za določen nabor zapiši v tabelo.

naloga+rešitev

$$\neg a \wedge \neg c \wedge (c \vee b)$$

$$\neg a \wedge b \wedge \neg c$$



0	0	0	0	0	1	0	0

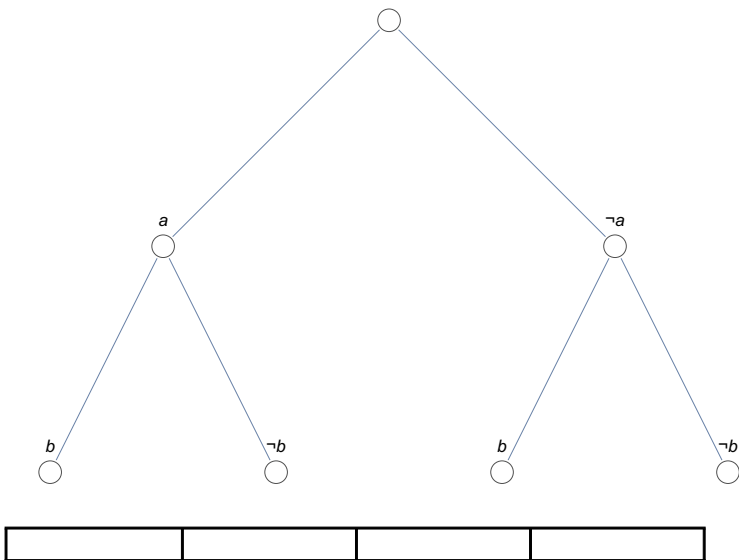


Logika d.o.o.

Naloge:

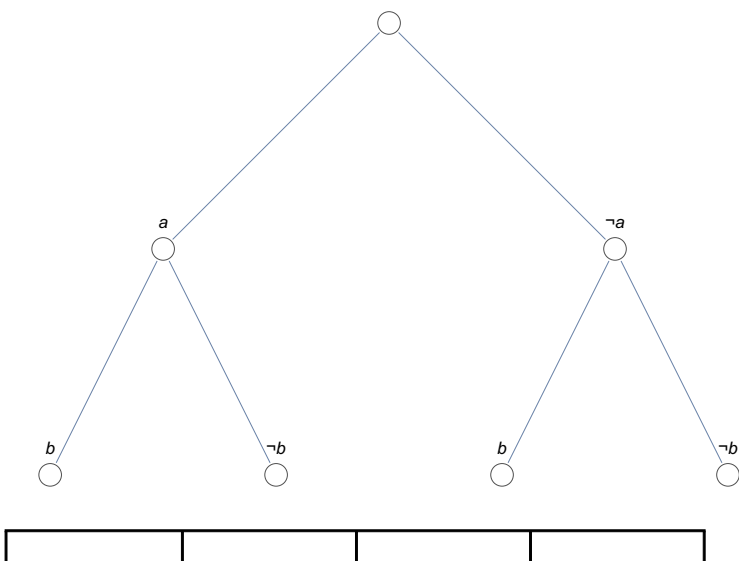
1.

$$b \wedge a$$
$$a \wedge b$$



2.

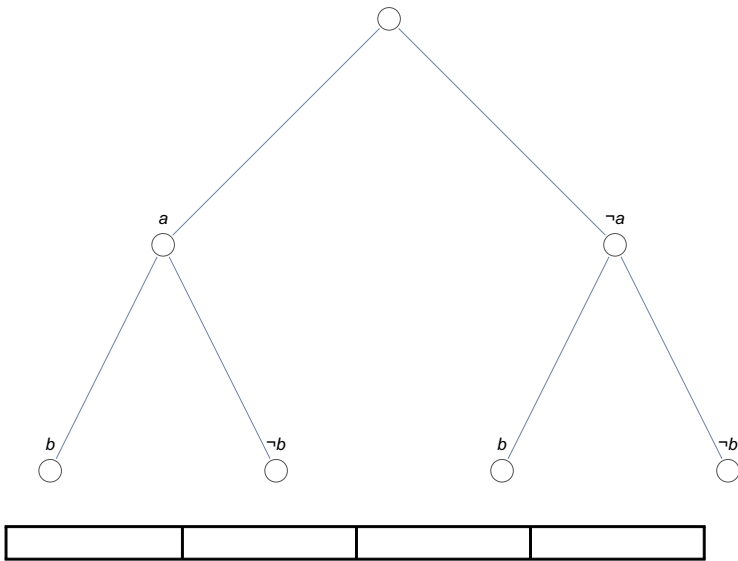
$$b \vee a$$
$$a \vee b$$



3.

$$\neg b \Rightarrow \neg a$$

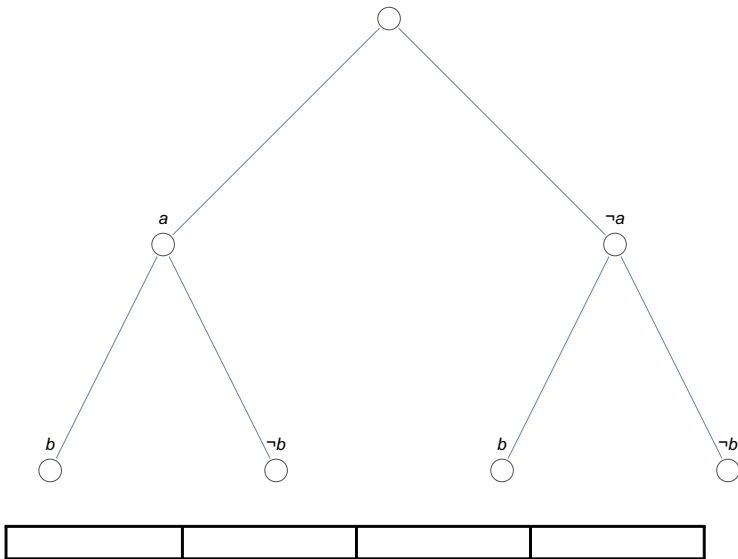
$$\neg a \vee b$$



4.

$$b \Leftrightarrow \neg a$$

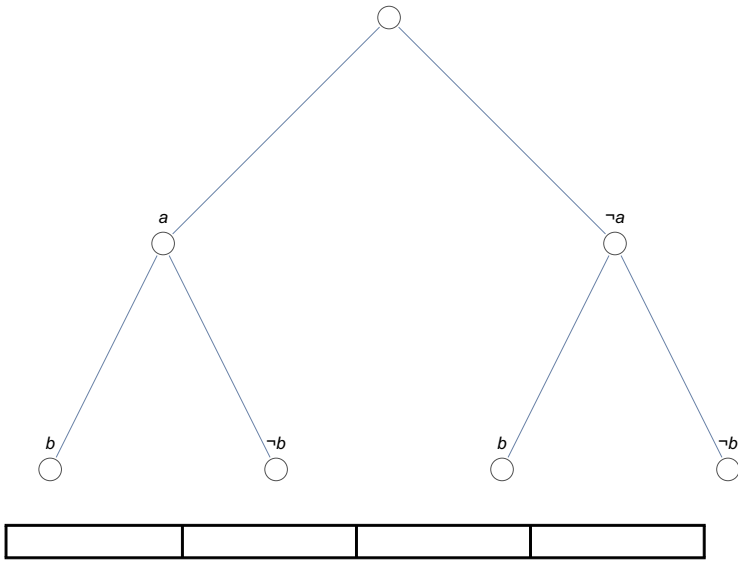
$$(a \wedge \neg b) \vee (\neg a \wedge b)$$



5.

$$a \wedge \neg b$$

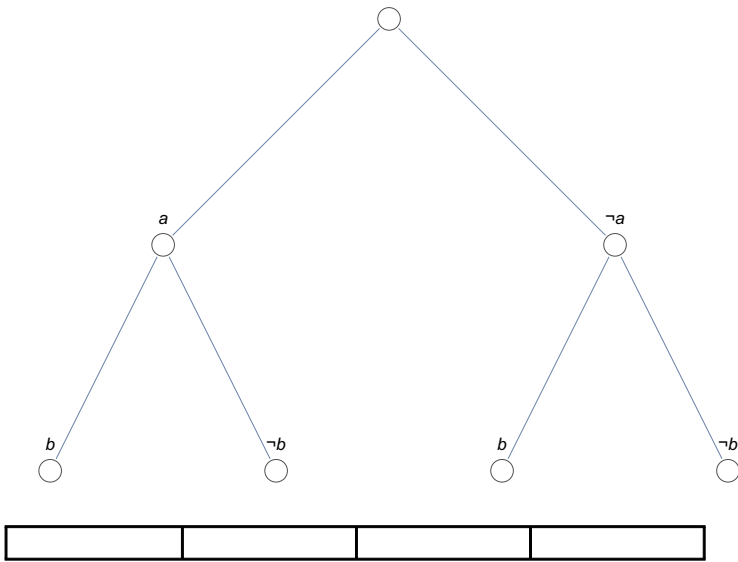
$$a \wedge \neg b$$



6.

$$b \wedge \neg a$$

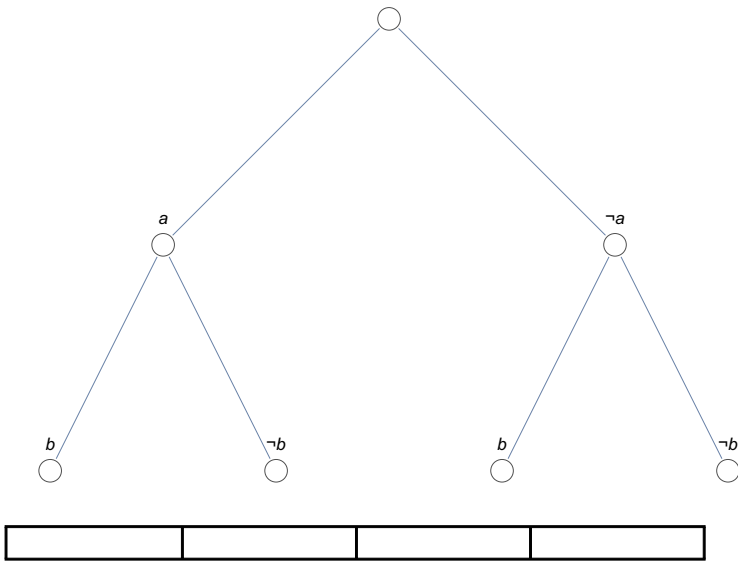
$$\neg a \wedge b$$



7.

$$a \Rightarrow \neg b$$

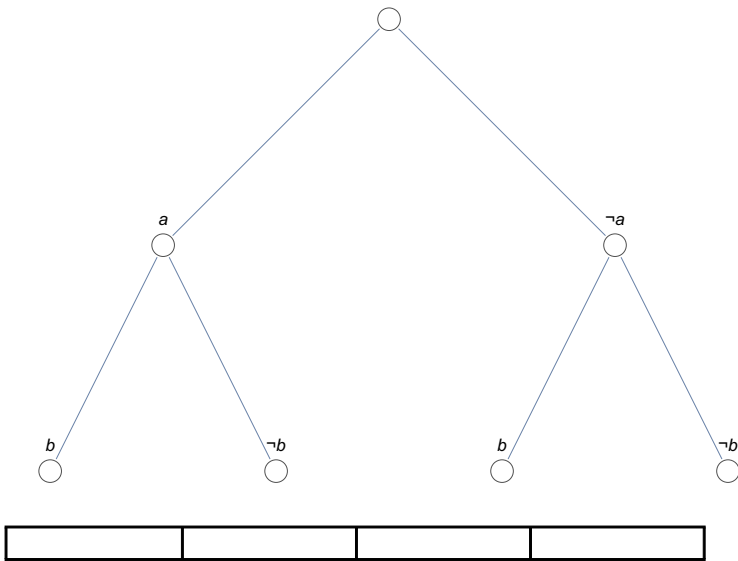
$$\neg a \vee \neg b$$



8.

$$b \vee \neg a$$

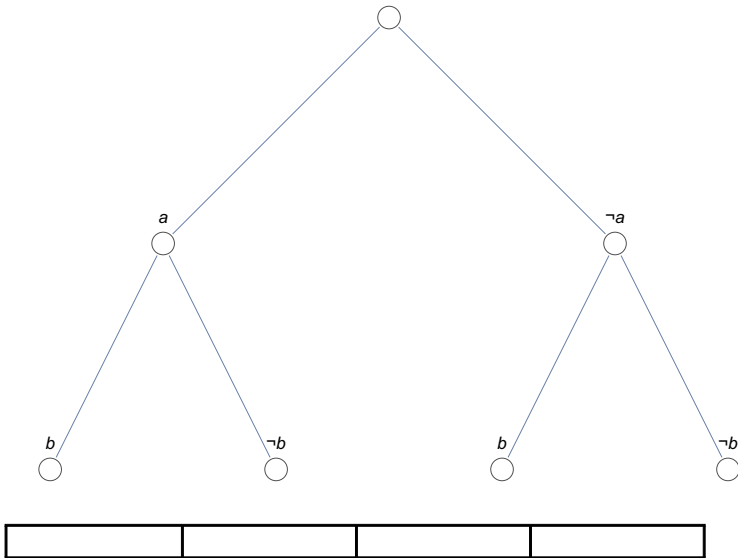
$$\neg a \vee b$$



9.

$$\neg a \wedge b$$

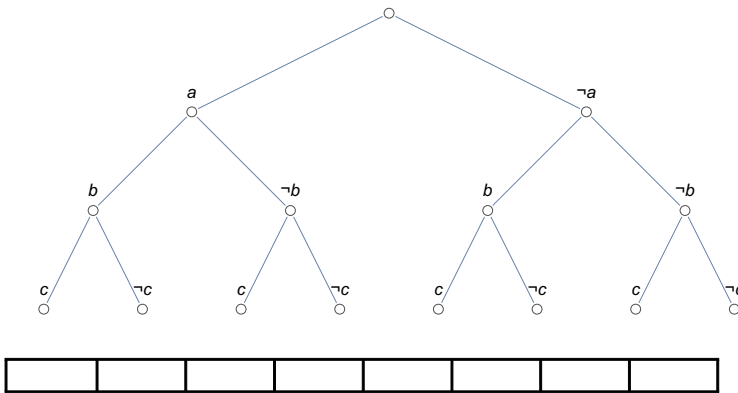
$$\neg a \wedge b$$



10.

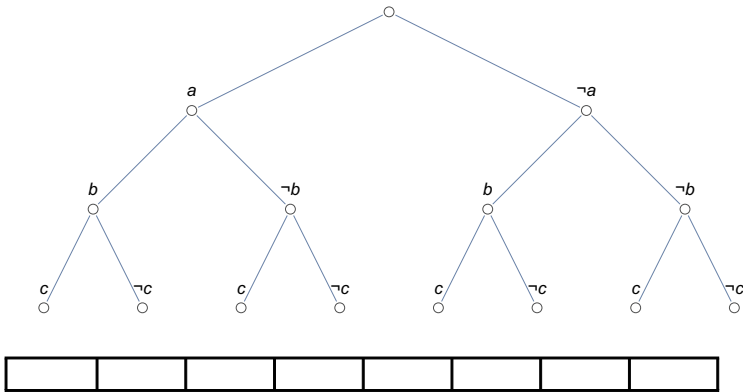
$$(\neg a \Leftrightarrow \neg c) \wedge (c \Rightarrow \neg a)$$

$$\neg a \wedge \neg c$$



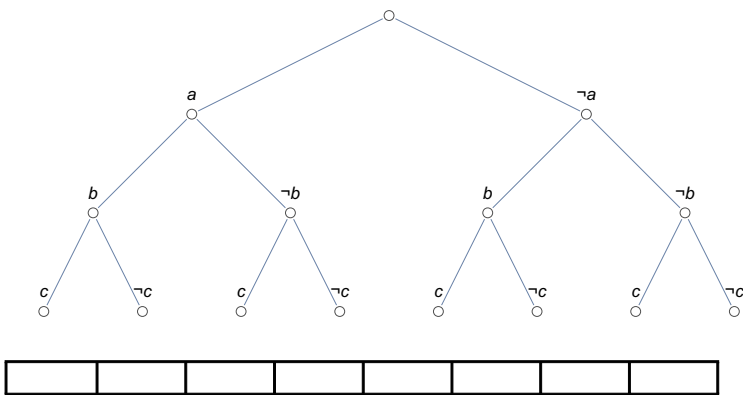
11.

$b \wedge c \wedge \neg c \wedge \neg a$
False



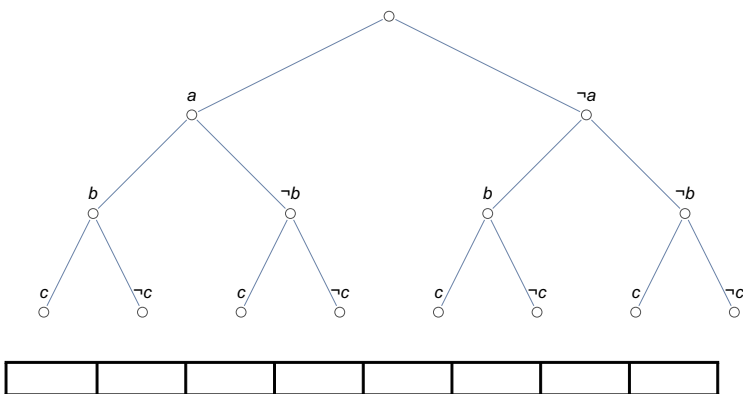
12.

$(\neg c \vee a) \wedge (\neg a \Rightarrow c)$
 a



13.

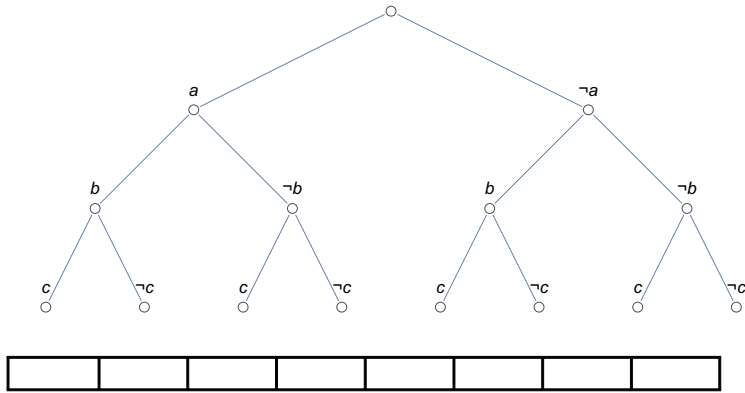
$(a \Leftrightarrow \neg c) \wedge (c \vee \neg a)$
 $\neg a \wedge c$



14.

$$(\neg a \Rightarrow \neg b) \wedge \neg b \wedge c$$

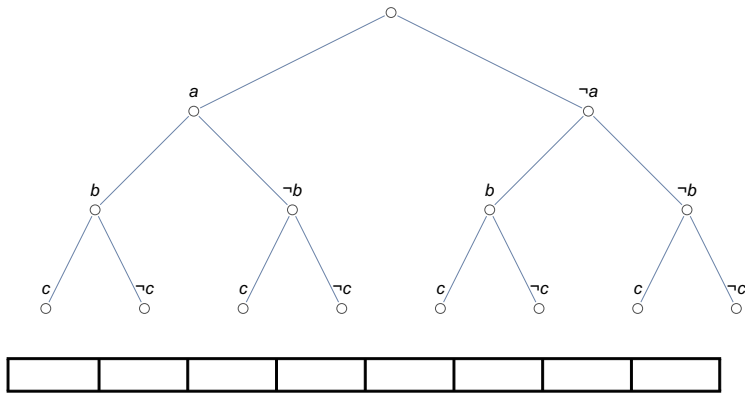
$$\neg b \wedge c$$



15.

$$\neg c \wedge \neg a \wedge (c \Leftrightarrow \neg b)$$

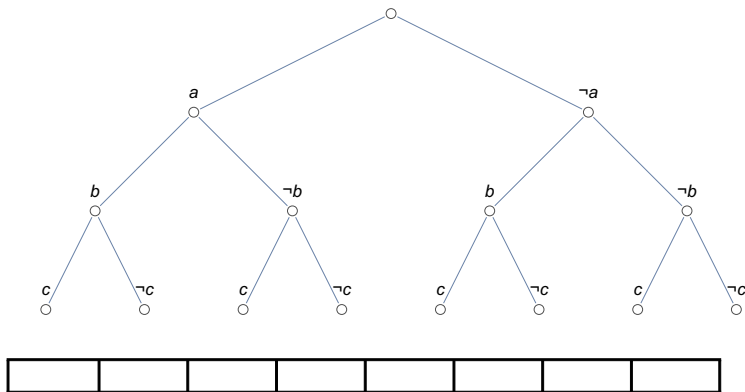
$$\neg a \wedge b \wedge \neg c$$



16.

$$(\neg a \Leftrightarrow \neg b) \wedge (a \Leftrightarrow b)$$

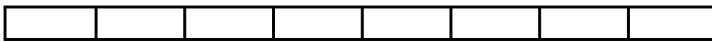
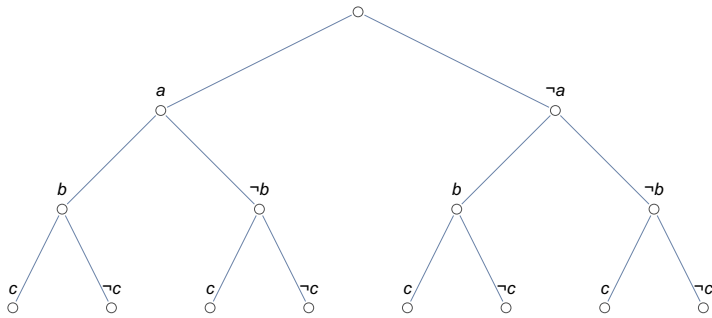
$$(a \wedge b) \vee (\neg a \wedge \neg b)$$



17.

$$(\neg b \vee a) \wedge (\neg c \vee b)$$

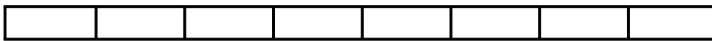
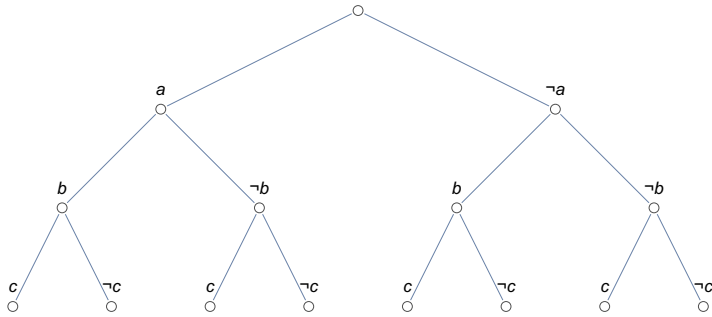
$$(a \wedge b) \vee (\neg b \wedge \neg c)$$



18.

$$(\neg b \vee a) \wedge (a \Leftrightarrow \neg c)$$

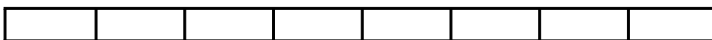
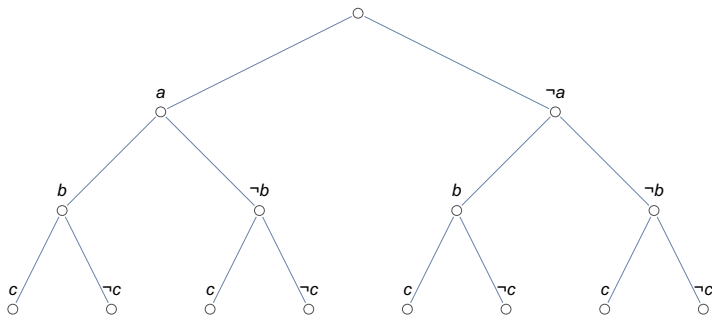
$$(a \wedge \neg c) \vee (\neg a \wedge \neg b \wedge c)$$



19.

$$(\neg c \Rightarrow b) \wedge (\neg c \vee a)$$

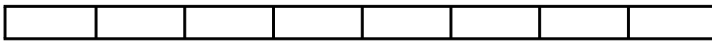
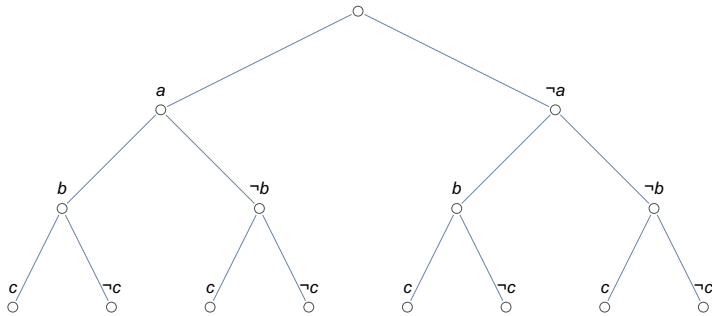
$$(a \wedge c) \vee (b \wedge \neg c)$$



20.

$$b \wedge a \wedge (b \Leftrightarrow c)$$

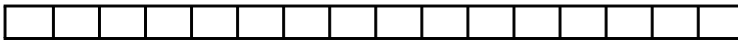
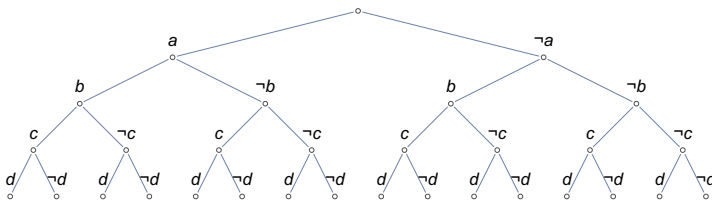
$$a \wedge b \wedge c$$



21.

$$c \wedge d \wedge c \wedge d \wedge (b \Leftrightarrow \neg a)$$

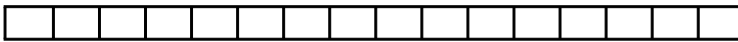
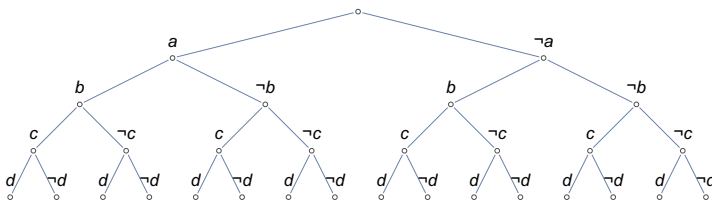
$$(a \wedge \neg b \wedge c \wedge d) \vee (\neg a \wedge b \wedge c \wedge d)$$



22.

$$(a \Leftrightarrow b) \wedge (c \vee a) \wedge (\neg b \Rightarrow c)$$

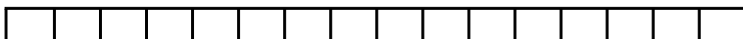
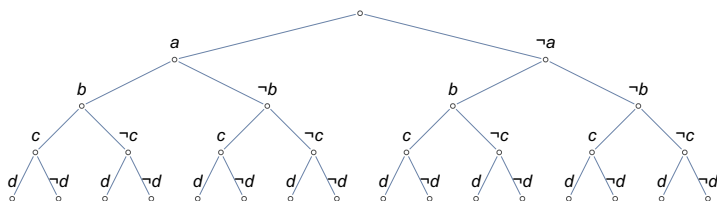
$$(a \wedge b) \vee (\neg a \wedge \neg b \wedge c)$$



23.

$$(b \Rightarrow \neg c) \wedge (c \Rightarrow \neg d) \wedge (d \vee \neg c)$$

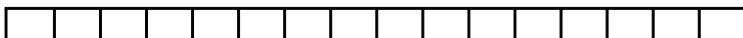
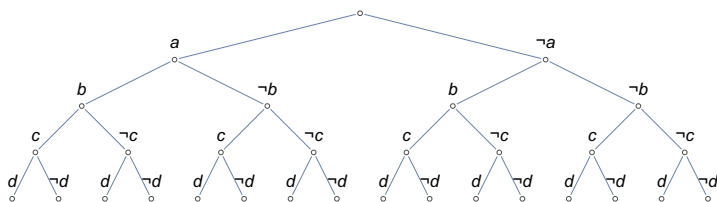
$$\neg c$$



24.

$$(c \Rightarrow a) \wedge \neg b \wedge \neg c \wedge (a \Rightarrow \neg b)$$

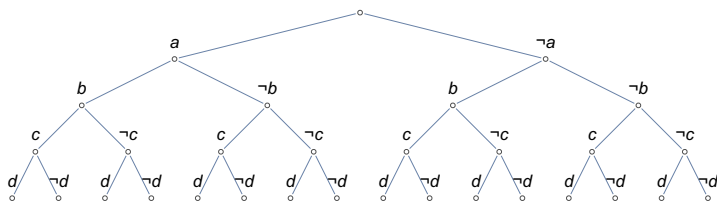
$$\neg b \wedge \neg c$$



25.

$$(b \vee c) \wedge (\neg c \vee \neg b) \wedge (d \Rightarrow \neg a)$$

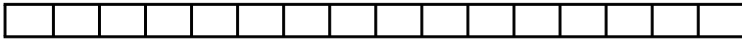
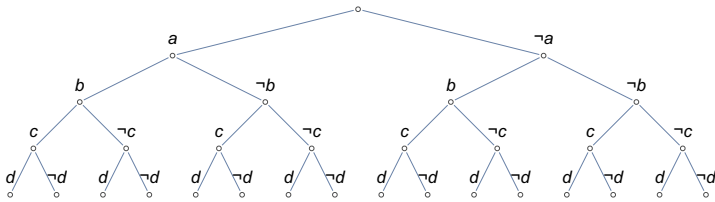
$$(\neg a \wedge b \wedge \neg c) \vee (\neg a \wedge \neg b \wedge c) \vee (b \wedge \neg c \wedge \neg d) \vee (\neg b \wedge c \wedge \neg d)$$



26.

$$(\neg b \vee c) \wedge \neg a \wedge c \wedge (\neg d \Rightarrow \neg a)$$

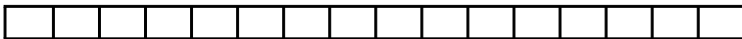
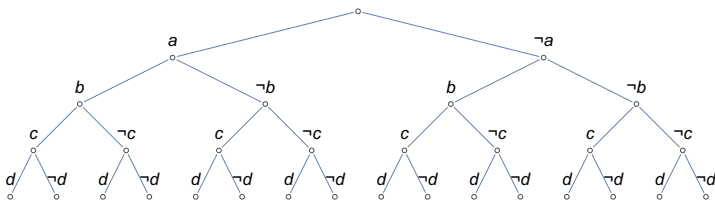
$$\neg a \wedge c$$



27.

$$b \wedge a \wedge (\neg c \vee a) \wedge (\neg b \Leftrightarrow \neg d)$$

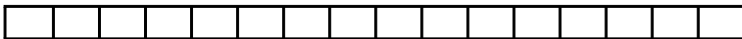
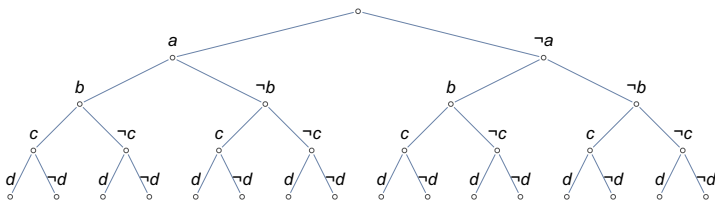
$$a \wedge b \wedge d$$



28.

$$(\neg a \vee d) \wedge (b \Leftrightarrow \neg a) \wedge (b \vee \neg a)$$

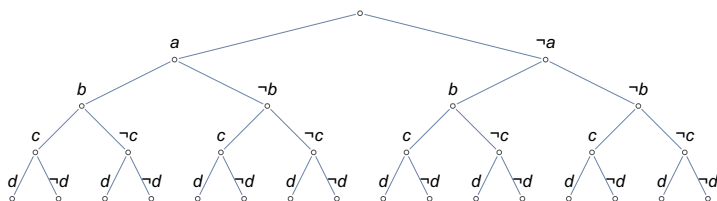
$$\neg a \wedge b$$



29.

$$(c \Rightarrow \neg a) \wedge a \wedge c \wedge (\neg a \Leftrightarrow \neg d)$$

False

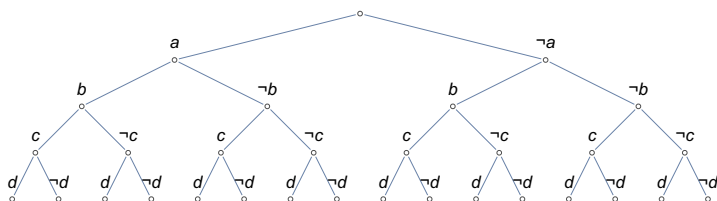


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30.

$$(a \Leftrightarrow \neg c) \wedge (\neg a \Rightarrow d) \wedge (a \Rightarrow \neg d)$$

$$(a \wedge \neg c \wedge \neg d) \vee (\neg a \wedge c \wedge d)$$

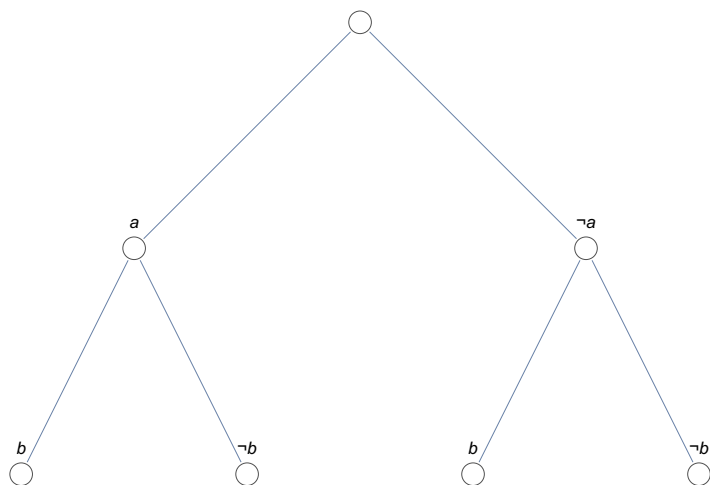


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Rešitve:

1.

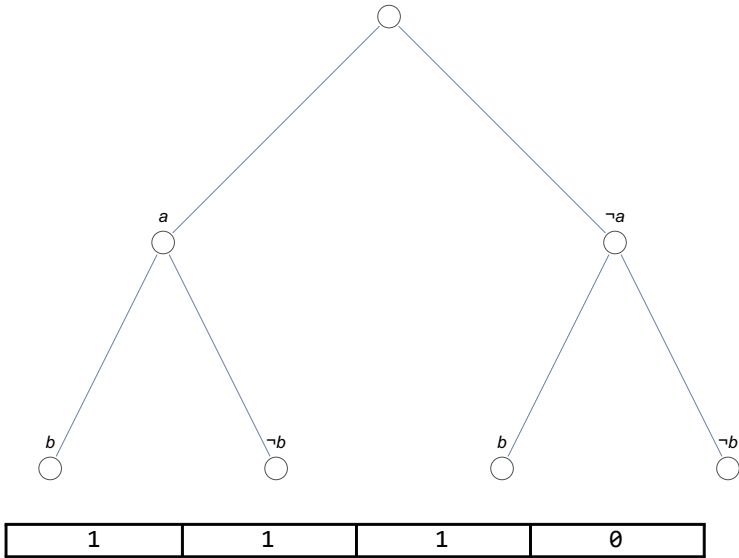
$$b \wedge a$$



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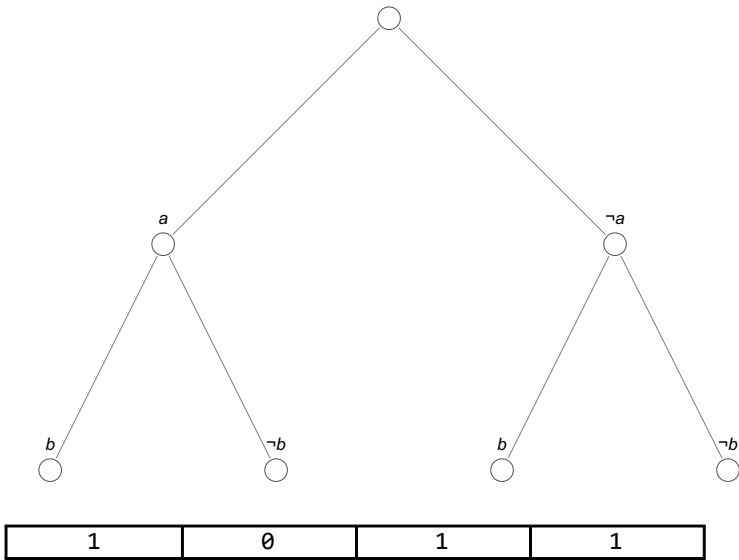
2.

$b \vee a$



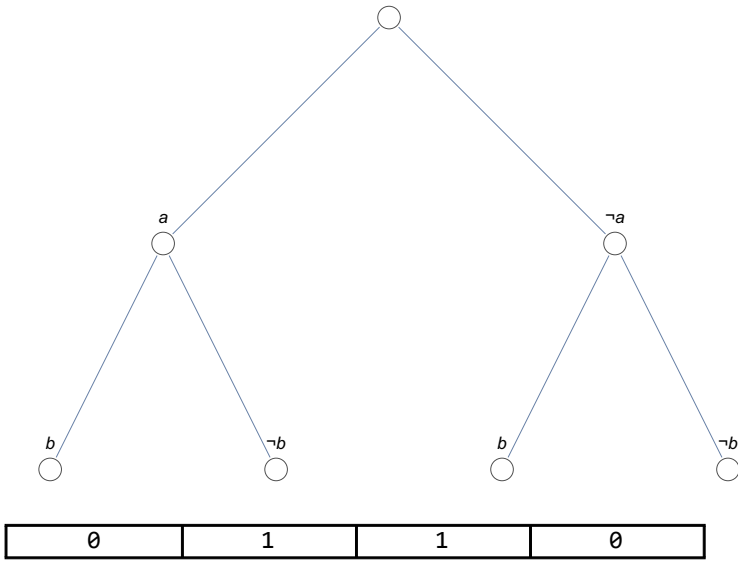
3.

$\neg b \Rightarrow \neg a$



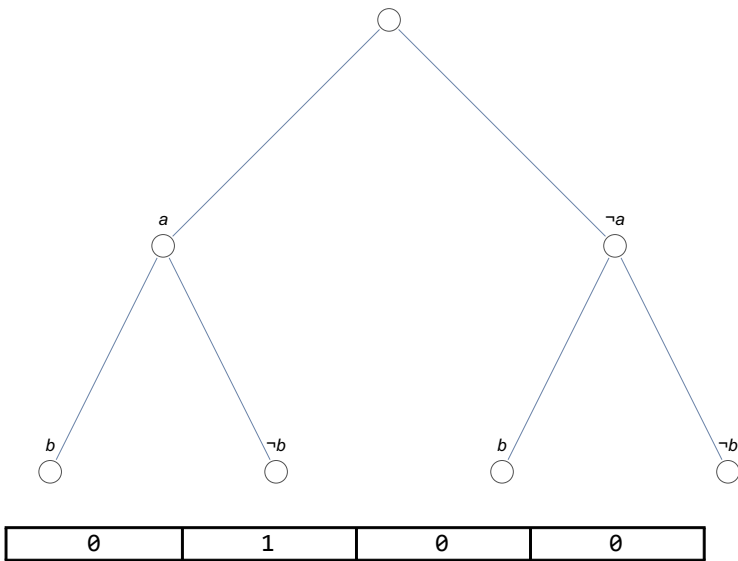
$b \Leftrightarrow \neg a$

4.



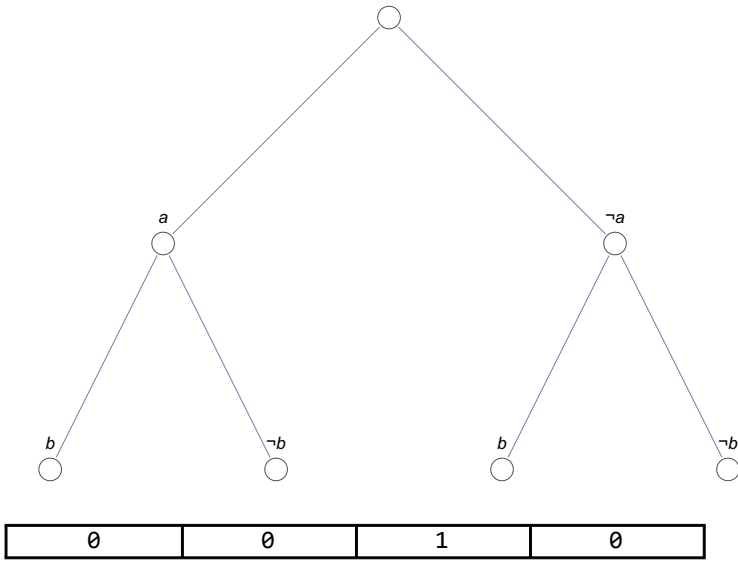
$a \wedge \neg b$

5.



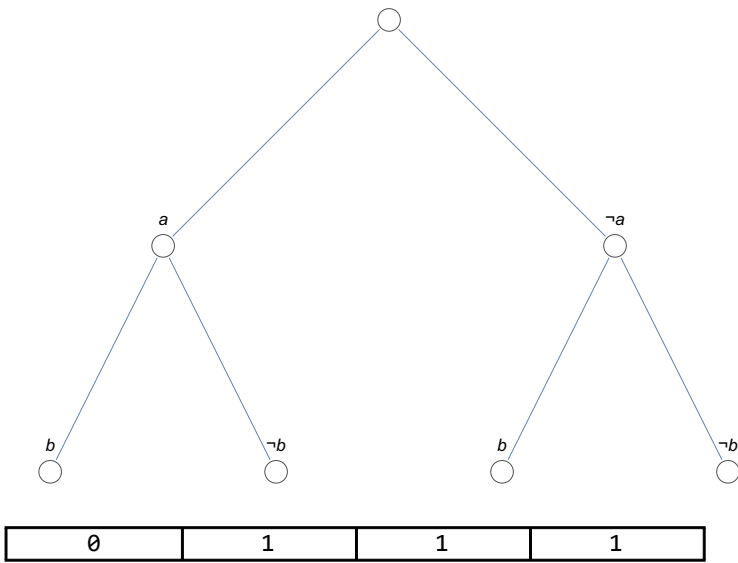
6.

$$b \wedge \neg a$$

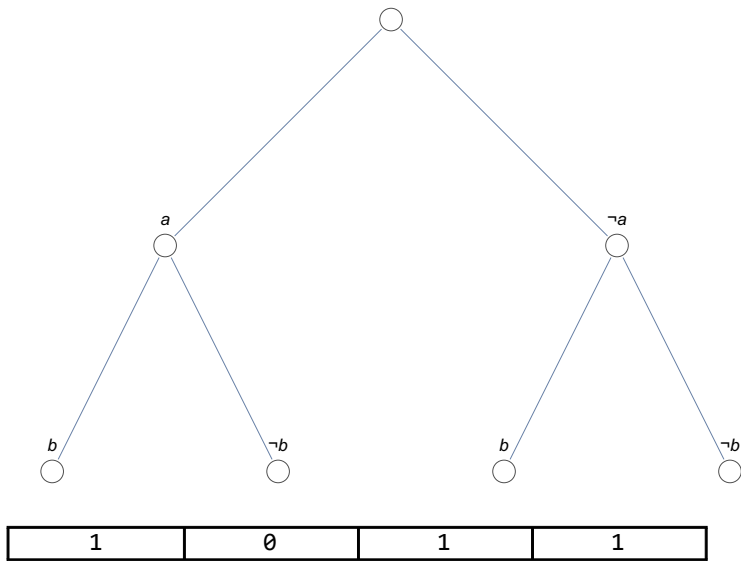


7.

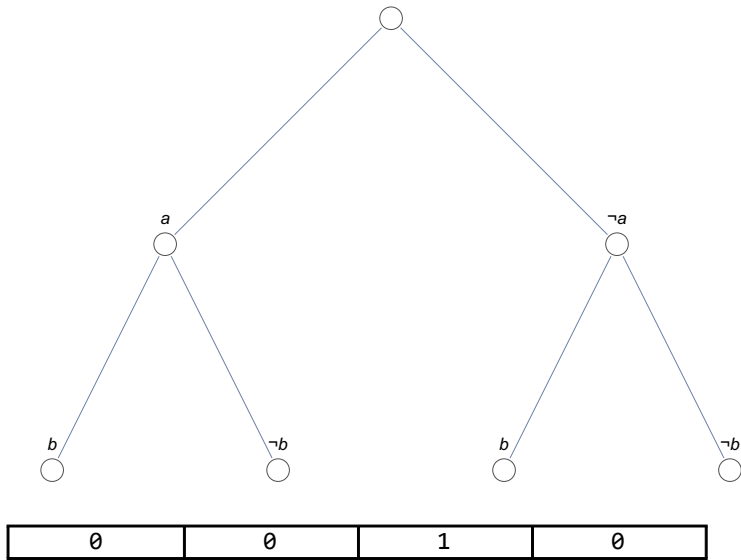
$$a \Rightarrow \neg b$$



8. $b \vee \neg a$

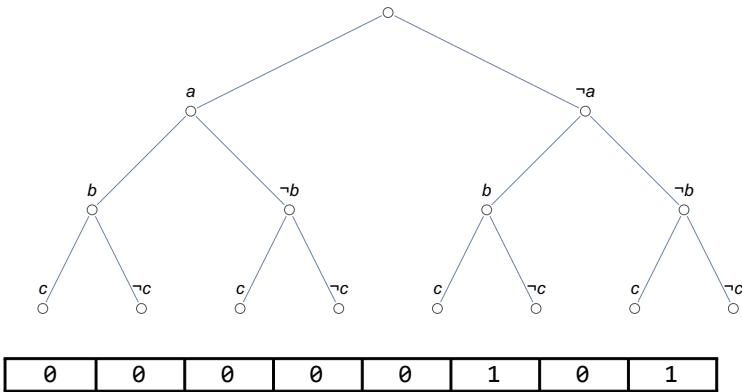


9. $\neg a \wedge b$



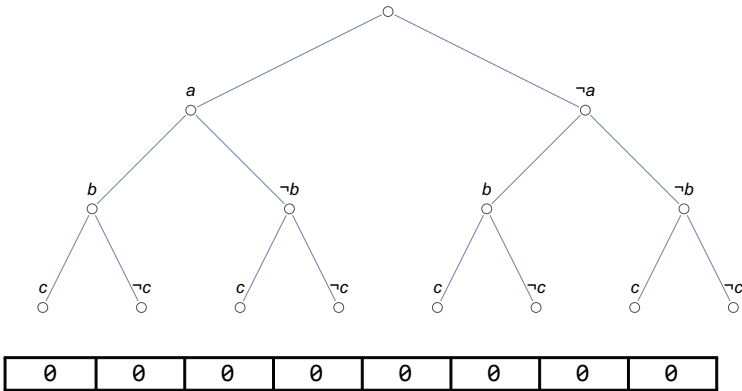
10.

$$(\neg a \Leftrightarrow \neg c) \wedge (c \Rightarrow \neg a)$$



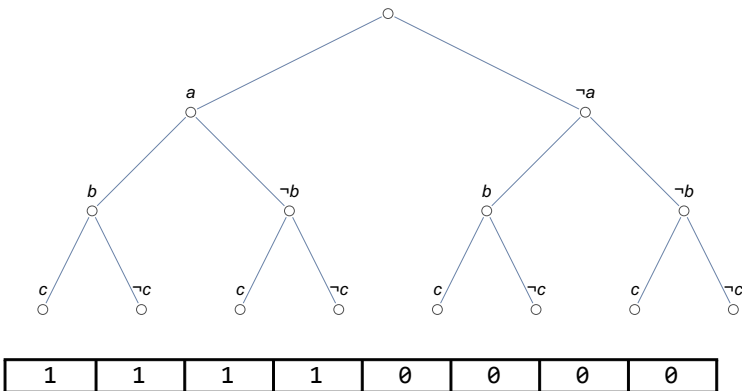
11.

$$b \wedge c \wedge \neg c \wedge \neg a$$



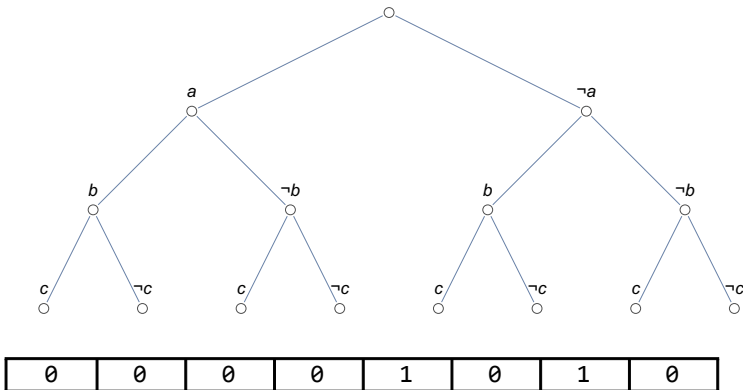
12.

$$(\neg c \vee a) \wedge (\neg a \Rightarrow c)$$



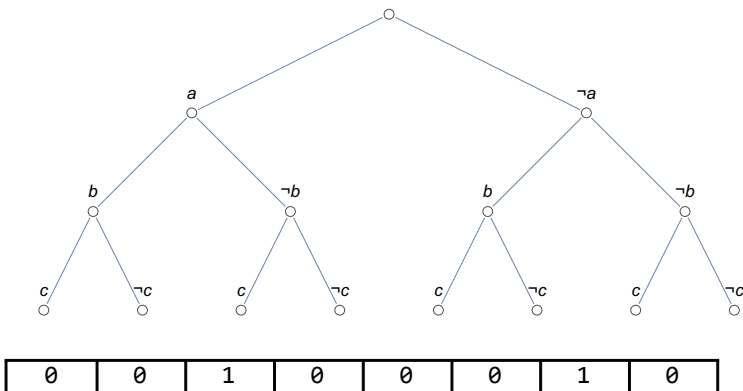
13.

$$(a \Leftrightarrow \neg c) \wedge (c \vee \neg a)$$



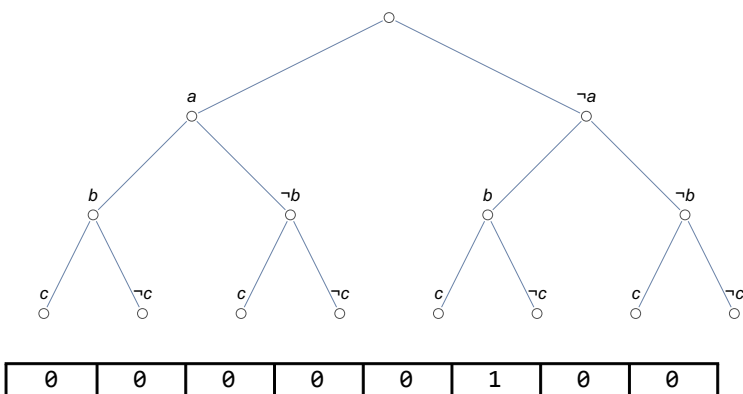
14.

$$(\neg a \Rightarrow \neg b) \wedge \neg b \wedge c$$



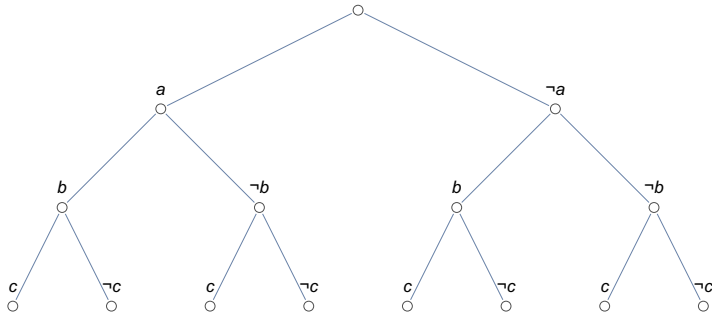
15.

$$\neg c \wedge \neg a \wedge (c \Leftrightarrow \neg b)$$



16.

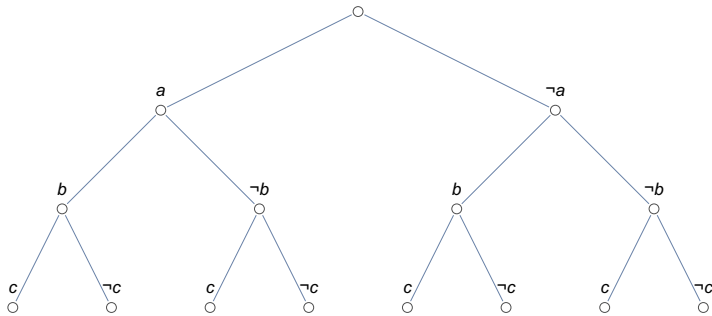
$$(\neg a \Leftrightarrow \neg b) \wedge (a \Leftrightarrow b)$$



1	1	0	0	0	0	1	1
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17.

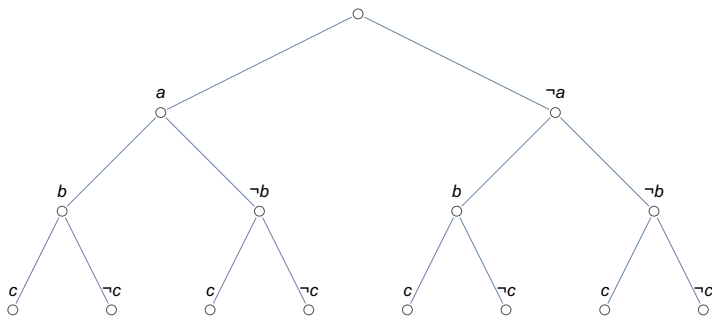
$$(\neg b \vee a) \wedge (\neg c \vee b)$$



1	1	0	1	0	0	0	1
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18.

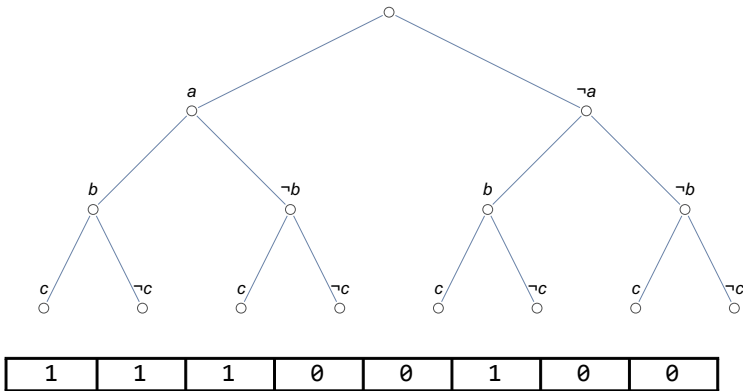
$$(\neg b \vee a) \wedge (a \Leftrightarrow \neg c)$$



0	1	0	1	0	0	1	0
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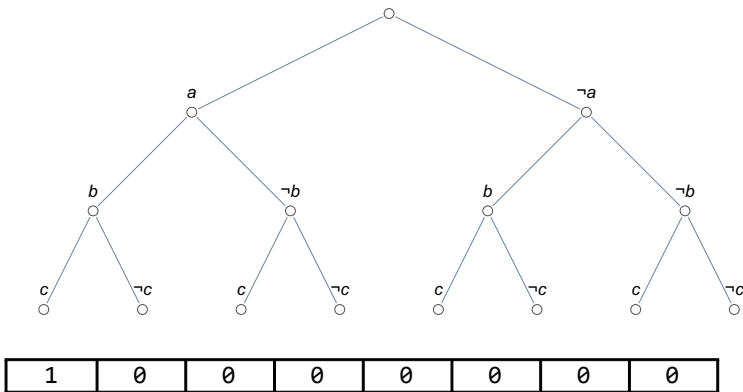
19.

$$(\neg c \Rightarrow b) \wedge (\neg c \vee a)$$



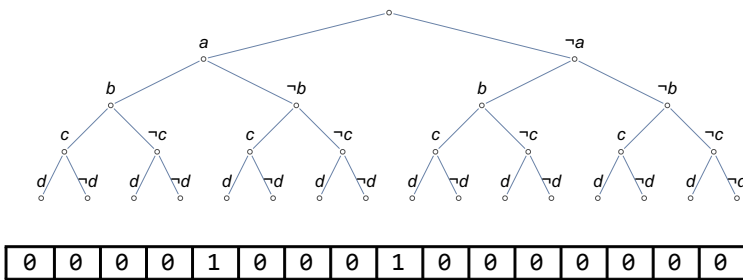
20.

$$b \wedge a \wedge (b \Leftrightarrow c)$$



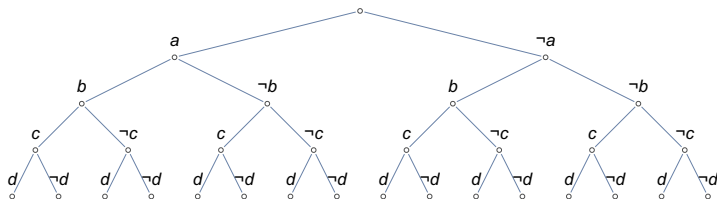
21.

$$c \wedge d \wedge \neg c \wedge d \wedge (b \Leftrightarrow \neg a)$$



22.

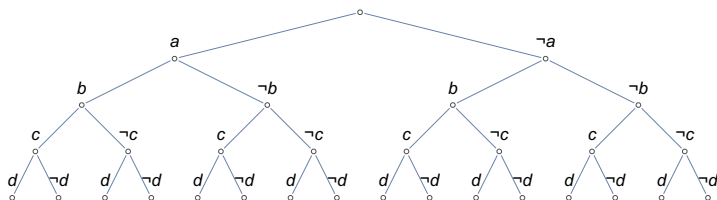
$$(a \Leftrightarrow b) \wedge (c \vee a) \wedge (\neg b \Rightarrow c)$$



1	1	1	1	0	0	0	0	0	0	0	0	1	1	0	0
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23.

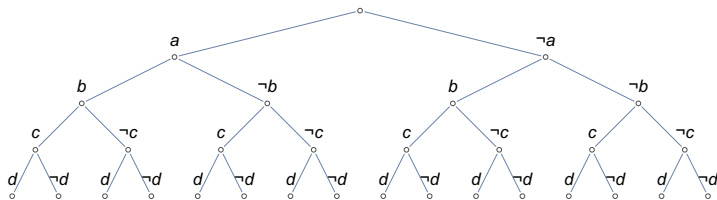
$$(b \Rightarrow \neg c) \wedge (c \Rightarrow \neg d) \wedge (d \vee \neg c)$$



0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
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24.

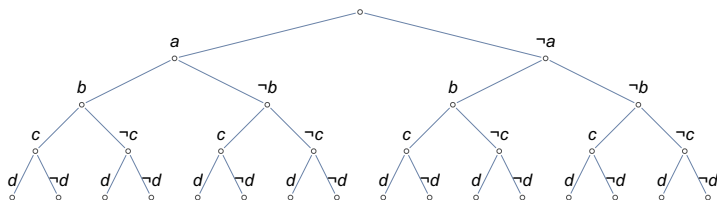
$$(c \Rightarrow a) \wedge \neg b \wedge \neg c \wedge (a \Rightarrow \neg b)$$



0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1
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25.

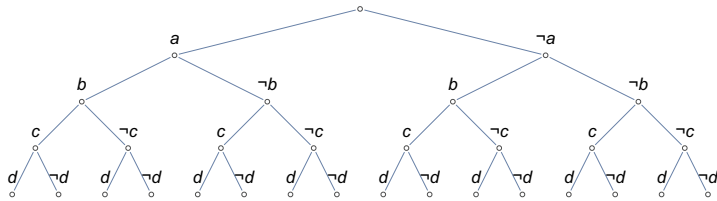
$$(b \vee c) \wedge (\neg c \vee \neg b) \wedge (d \Rightarrow \neg a)$$



0	0	0	1	0	1	0	0	0	0	1	1	1	1	0	0
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30.

$$(a \Leftrightarrow \neg c) \wedge (\neg a \Rightarrow d) \wedge (a \Rightarrow \neg d)$$



0	0	0	1	0	0	0	1	1	0	0	0	1	0	0	0
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Referenca : Izidor Hafner
 Representation of Boolean Functions Using Binary Trees
 Wolfram Demonstrations Project
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