EXERCICES	POINTS
Exercise 1	10
Exercise 2	10
Exercise 3	30
Exercise 4	50
TOTAL	**100**

Exercise 1: Boolean expression

Demonstrate these equalities using the 7 simplification rules you have learnt.

1. (A or B or C) and (!A or B or C) = B or C
   =(A or !A) and (B or C)
   =True and (B or C)

2. (A and B) or (!A or !B) = True

   False or true =True

Exercise 2: Truth table

1. **A and (A or B)**

A	B	A and (A or B)
True	True	True
True	False	True
False	True	False
False	False	False

A and (A or B) = (A and A) or (A and B)
= A or (True and A)
= A

2. **(A and B) or !C or [C and (!A or !B)]**

A	B	C	(A and B) or !C or [C and (!A or !B)]
True	True	True	(True and True) or !True or [True and (! True or !True)] = True
True	True	False	(True and true) or !False or [False and (!True or !True)] = True
True	False	True	(True and False) or !True or [True and (!True or !False)] = True
True	False	False	(True and False) or !False or [False and (!True or !False)] = True
False	True	True	(False and True) or !True or [True and (!False or ! True)] = True
False	True	False	(false and True) or !False or [false and (!False or !True)] = True
False	False	True	(false and False) or !True or [true and (!Fasle or !false)] = true
False	False	False	(Fasle and False) or !false or [False and (!False or !False)] =True

(A and B) or !C or [C and (!A or !B)] = [A and (B or true)] or [(C and !A) or (C and !B)]

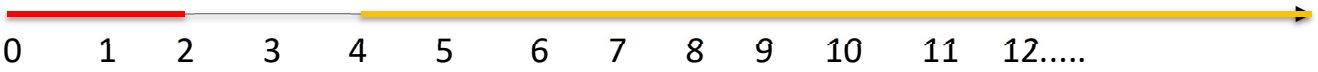
= (A and True) or (False or false)

= True

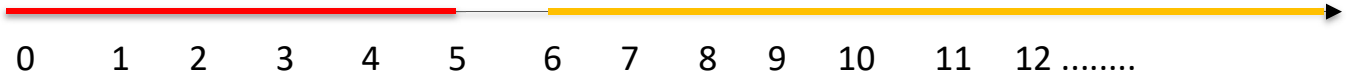
Exercise 3: Ranges

1. **Simplify** the expressions

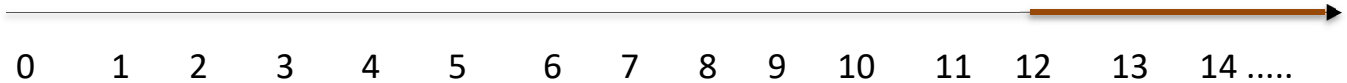
a) a < 3 or a > 3



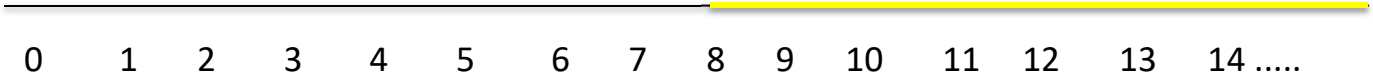
b) a >5 or a < 6



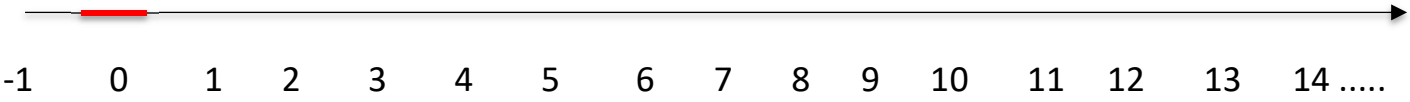
c) a > 2 and a > 12



d) a >= 8 or a > 8

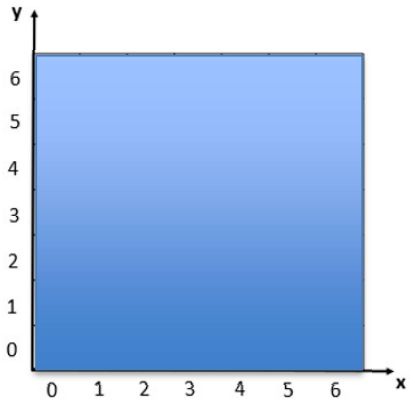


e) a >=0 and a <= 0

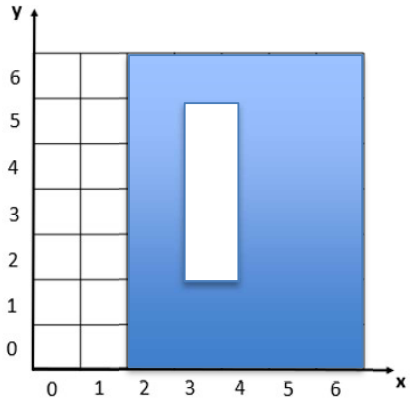


2. Draw the shape corresponding to the boolean expression

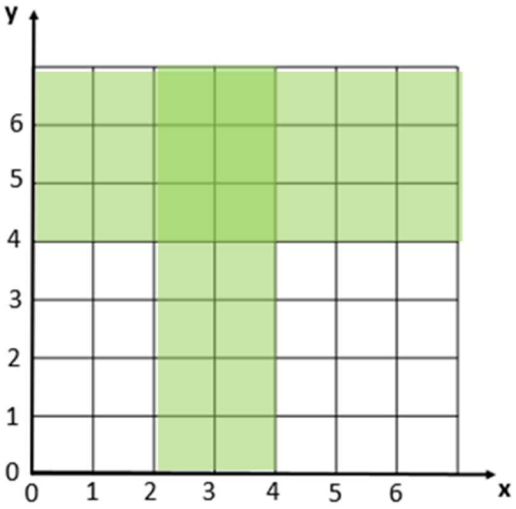
a) (x = y)



b) `(x>2) and not((x>3 and x<4) and (y>2 and y<6))`



a) Write the boolean condition for this grid

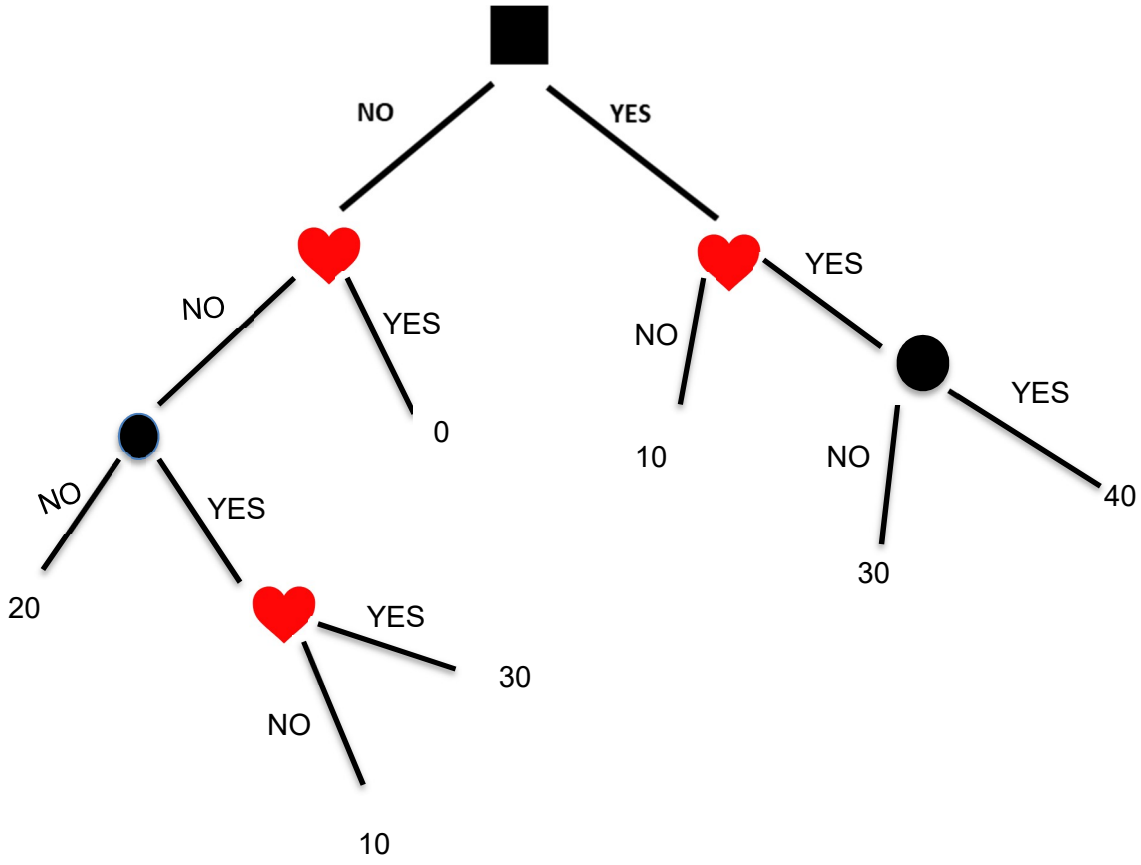


Expression: (X > 2 and X < 4) or (Y > 4 or Y > 6)

Exercise 4: Flowcharts

1. Draw the tree of conditions

CELLS CONTENT EXACTLY	POINTS
■	10
■ ♥ ●	40
■ ♥	30
<NOTHING>	20
●	10
● ♥	30



2. Say what I do thanks to the flowchart below?

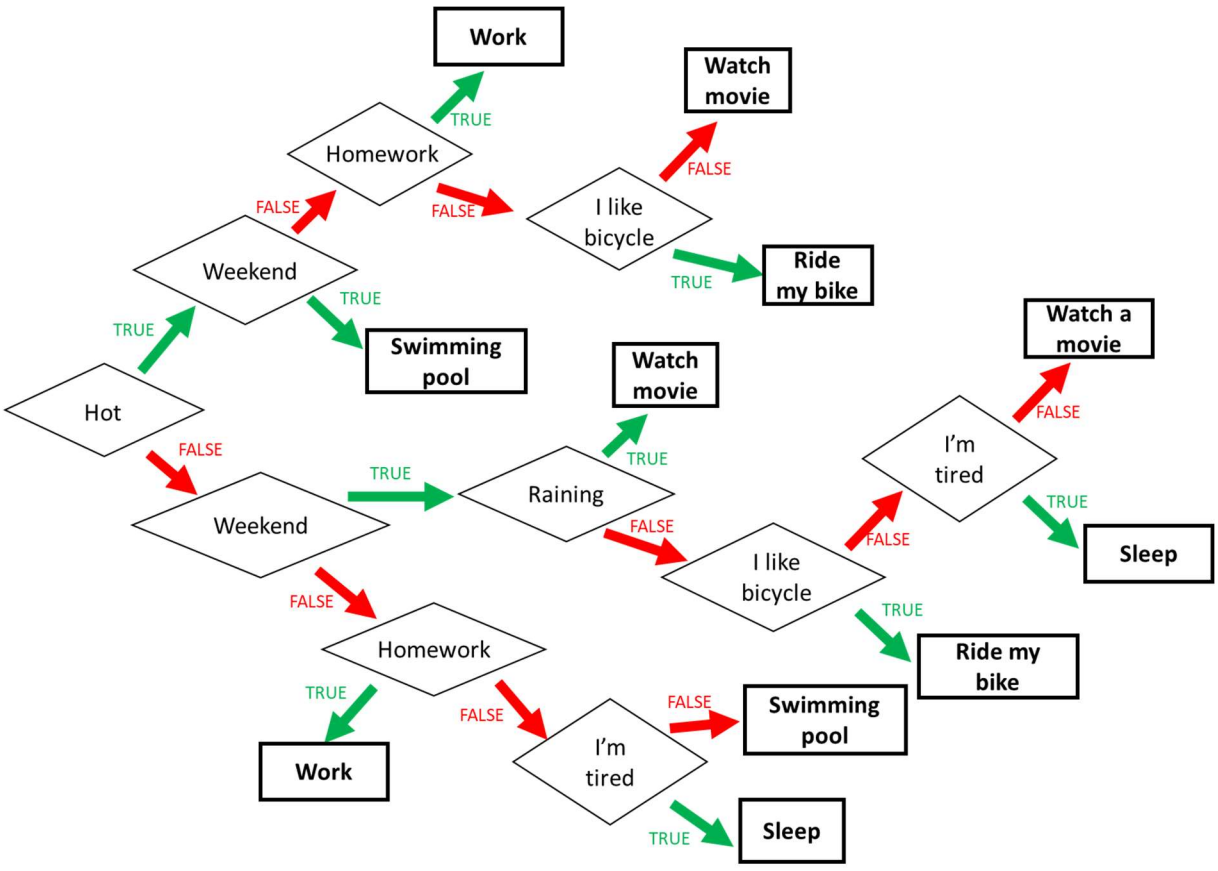
   a. It is Monday, it's hot and I have homework. What I do? work

   b. It's Sunday, it's cold, it's not raining, I don't like bicycle and I'm not tired. What I do? Watch movie

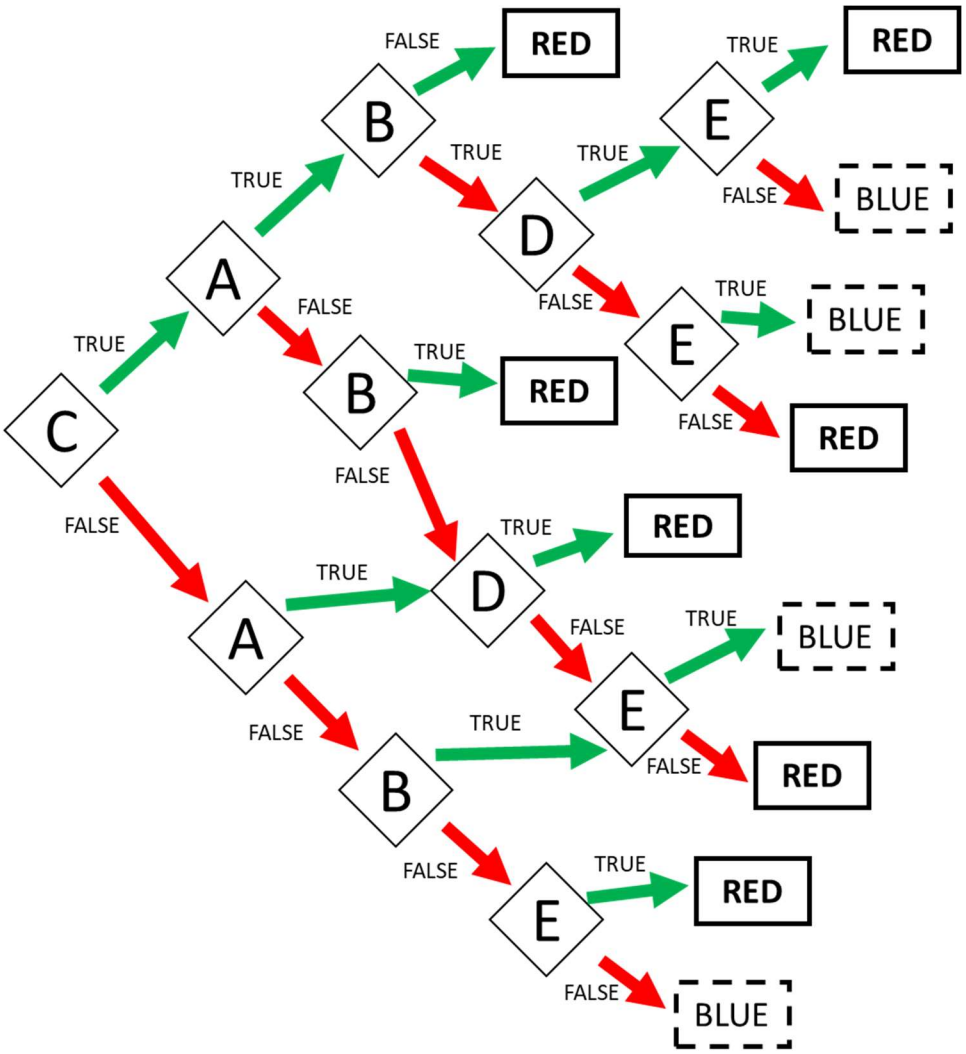
   c. It's Friday, it's cold and raining, I'm tired but I don't have homework. What I do? sleep

   d. When do I ride my bike? **Give a boolean expression**

Hot and not weekend and don't have homework and I like bicycle OR
Not hot and weekend and not raining and I like bicycle



3. Find the boolean expression of **RED** of this flowchart



Expression: RED = CAB or CA!BDE or CA!B!D!E or C!AB or C!A!BD or C!A!B!D!E or !CAD or !C!AB!E or !C!A!BE