	Трехэтажный лифт									
	Description. NL requirement	trigger event	release event	final event	allowable delay	invariant condition	reaction	LTL formula	общий вид формулы класса	класс
1	Должна быть исключена одновременная подача сигналов на перемещение лифта вверх и вниз	Up ∧ Down	false	true	true	true	false	G(¬(Up ∧ Down))	G(¬trig)	#4
2	Должна быть исключена одновременная подача сигналов на перемещение лифта вверх и вниз	true	false	true	true	¬(Up ∧ Down)	true	G(¬(Up ∧ Down))	G(inv)	#2
3	The doors must always be closed when the elevator is moving.	(LED_call) V LED_button1) V (¬ (LED_call2 V LED_button2) A (LED_call0 V LED_button0))	false	true	true	door02closed	true	G(((LED_call) V LED_buttonl)) V (~(LED_call2 V LED_button2) A (LED_call0 V LED_button0))) + door0.2closed)	G(trig → inv)	#8
4	The elevator must continue traveling in the same direction as long as there are remaining requests in this direction.	onfloor1 Л doorlclosed. RE Л (Down.L > Up.L) Л (Up.L > 0) (* шли вверх и стоим *)	(LED_call V LED_button1) V (~ (LED_call2 V LED_button2) A (LED_call0 V LED_button0))	(LED_call2 V LED_buttton2)	true	true	Up*	C((onfloor) A doorlclosed PE A (DownL > UpL) A (UpL > 0)) + (C[- (LED_call2 V LED_button2)] V (-(LED_call2 V LED_button2) U (((LED_call2 V LED_button2) U (((LED_call2 V LED_button2) A (LED_call2 V LED_button2) A (LED_call2 V LED_button2) A (LED_call2 V LED_button2) M (LED_call2 V LED_button2) M (LED_call2 V LED_button2 A Up*))))))	G(trig → (G(¬fin) V (¬fin U (rel V (fin Λ rea)))))	#27A
5	The elevator must continue traveling in the same direction as long as there are remaining requests in this direction.	onfloor1 Л door1closed. RE Л (Down.L > Up.L) Л (Up.L > 0) (* шли вверх и стоим *)	(LED_call2 V LED_button2) V (LED_call1 V LED_button1)	(LED_call0 V LED_button0)	true	true	Down*	G((onfloor) A doorlclosed.RE A (Down.L > Up.L) A (Up.L > 0)) + (G(~ ((LED_call0 V LED_button0))) V (¬((LED_call0 V LED_button0)) U (((LED_call2 V LED_button2)) V (ED_call1 V LED_button1)) V (((LED_call0 V LED_button1)	G(trig → (G(¬fin) \lor (¬fin \lor (rel \lor (fin \land rea)))))	#27A
6	If there are no further requests, the elevator must stop and become idle.	¬(call0.2_LED V button0.2_LED)	false	true	true	¬Up ∧ ¬Down	¬Up* ∧ ¬Down*	$G(\neg(call0.2_LED \ V \ button0.2_LED) + ((\neg Up \ \land \ \neg Down) \ \land \ (\neg Up^* \ \land \ \neg Down^*)))$	G(trig → (inv ∧ rea))	#13A
7	If only requests for the opposite direction are present, the elevator must switch the preferred direction and start serving the requests.	¬Up ∧ ¬Down ∧ onfloor0	call0_LED V button0_LED V ~door0closed	call1_LED V call2_LED V button1_LED V button2_LED	true	true	Up*	G((-Up A -Down A onfloor0) + (G(-(call1_LED V call2_LED V button1_LED V button2_LED)) V (-(call1_LED V call2_LED V button1_LED V button2_LED) U ((call0_LED V button0_LED V -door0closed) V ((call1_LED V call2_LED A button1_LED V button1_LED	G(trig → (G(¬fin) V (¬fin U (rel V (fin Λ rea)))))	#27A
8	Если стоим на этаже и есть необработанный запрос на открытие на текущем этаже – открываем двери	¬Up A ¬Down A onfloor0	¬door0closed	call0_LED V button0_LED	true	true	Door0*	G((¬Up A ¬Down A onfloor0) + (G(¬(call0_LED V button0_LED)) V (¬(call0_LED V button0_LED) U (¬door0closed V ((call0_LED V button0_LED A Door0*)))))	G(trig → (G(¬fin) V (¬fin U (rel V (fin Λ rea)))))	#27A
9	When the cab has reached a proper location at a requested floor, the elevator must open the door and then close it after a three seconds pause	Up.FE V Down.FE A floor0 A (LED_call0 V LED_button0)	false	true	true	true	door_open*	G((Up.FE V Down.FE A floor0 A (LED_call0 V LED_button0)) + door_open*)	G(trig → rea)	#1A
10	Светодиод кнопки вызова лифта загорается в момент отпускания кнопки.	call0.FE	false	true	true	true	call0_LED+	G(call0.FE → call0_LED*)	G(trig → rea)	#1A
11	Светодиоды кнопок вызова и перемещения лифта на нулевой этаж гаснут в момент открытия двери на нулевом этаже.	door0closed.FE	false	true	true	true	-call0_LED Λ -button0_LED	G(door0closed.FE + (¬call0_LED* Λ ¬button0_LED*))	G(trig → rea)	#1A
	Турникет									
	Description. NL requirement	trigger event	release event	final event	allowable delay	invariant condition	reaction	LTL formula	общий вид формулы класса	класс
1	После появления с монетоприемника сигнала получения оплаты рауеd немедленно должен быть сформирован сигнал открытия турникета open.	payed.RE	false	true	true	true	open	G(payed.RE → open)	G(trig → rea)	#1A
2	Сигнал open должен быть в состоянии true не более 10 секунд.	open.RE	false	true	passed(10s)	true	¬open	G(open.RE + (¬passed(10s) U ¬open*))	G(trig → (¬del U rea))	#36A
3	Сигнал open должен быть в состоянии true не более 10 секунд. * (снятие open сторонним агентом)	open.RE	¬open	true	passed(10s)	true	¬open'	G(open.RE + (~passed(10s) U (~open V ~open*)))	G(trig → (¬del U (rel V rea)))	#37A
4	Сигнал open должен быть в состоянии true не менее 1 секунды, но не более 10 секунд.	open.RE	false	passed(1s)	passed(9s)	open	¬open'		G(trig → (G(inv ∧ ¬fin) V ((inv ∧ ¬fin) U (fin ∧ ((inv ∧ ¬del) U (inv ∧ rea))))))	#25A

Сушилка для рук									
Description. NL requirement	trigger event	release event	final event	allowable delay	invariant condition	reaction	LTL formula	общий вид формулы класса	класс
If the dryer (D) was not turned on and hands (H) appeared, it will turn on ASAP.	H.RE ∧ ¬D	false	true	true	true	D'	G((H.RE ∧ ¬D) → D*)	G(trig → rea)	#1A
If the hands (H) are present and the dryer (D) is on, it will not turn off.	HAD	false	true	true	true	D'	G((H ∧ D) → D')	G(trig → rea)	#1A
If there is no hands (H) and the dryer (D) is not turned on, the dryer will not turn on until the hands appear.	¬H ∧ ¬D	false	true	true	true	¬D'	G((¬H ∧ ¬D) → ¬D*)	G(trig → rea)	#1A
If the dryer (D) is on, then it turns off after no hands (H) are present for 1 second.	D A H.FE	Н	passed(1s)	true	D	¬D'	G((D \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	$G(trig * (G(inv \land \neg fin) \lor ((inv \land \neg fin) \cup (rel \lor (fin \land (inv \land rea))))))$	#16A
Сушилка для рук*									
Description. NL requirement	trigger event	release event	final event	allowable delay	invariant condition	reaction	LTL formula	общий вид формулы класса	класс
If the dryer (D) was not turned on and hands (H) appeared, it will turn on ASAP.	H.RE ∧ ¬D	false	true	true	true	D'	((H.RE ∧ ¬D) → D	G(trig → rea)	#1A
If the hands (H) are present and the dryer (D) is on, it will not turn off.	HΛD	D.H >= #T1h	true	true	true	D'	D) → ((D.H >= #T1h	G(trig → (rel V rea))	#5A
If there is no hands (H) and the dryer (D) is not turned on, the dryer will not turn on until the hands appear.	¬H ∧ ¬D	false	true	true	true	¬D')((¬H ∧ ¬D) → ¬D	G(trig → rea)	#1A
If the dryer (D) is on, then it turns off after no hands (H) are present for 1 second.	D Λ H.FE	Н	passed(1s)	true	D	¬D'	G((D ∧ H.FE) → (G(D ∧ ¬passed(ls)) ∨ ((D ∧ ¬passed(ls)) U (H ∨ (passed(ls) ∧ (D ∧ ¬D*)))))))	$G(\text{trig} \rightarrow (G(\text{inv } \Lambda \neg \text{fin}) \ V \ ((\text{inv } \Lambda \neg \text{fin}) \ U \ (\text{rel } V \ ((\text{fin } \Lambda \ (\text{inv } \Lambda \ \text{rea}))))))$	#16A
The time of continuous work of dryer (D) is no more than an hour.	<u>D.RE</u>	¬D	passed(1h)	true	true	¬D'	G(D.RE → (G(¬passed (lh)) V (¬passed(lh) U (¬D V (passed(lh) Λ ¬D*))))))	G(trig → (G(¬fin) V (¬fin U (rel V (fin ∧ rea)))))	#34A
Робот-пылесос									
Description. NL requirement	trigger event	release event	final event	allowable delay	invariant condition	reaction	LTL formula	общий вид формулы класса	класс
Если сработал сигнал переполнения пылесборника (full), то он (робот-пылесос) должен остановиться (stop = true) и подать звуковой сигнал (sound = true)	<u>full.RE</u>	false	true	true	true	stop ∧ sound	G(full.RE → (stop Λ sound))	G(trig → rea)	#1A
Cychones and coffy:				d IC	\/IC //		1/0.2/	\11/F\	
Systems and software						CEE 29	7148:20)II(E)	
Description. NL requirement	trigger event	release event	event	delay	condition	reaction	LTL formula	общий вид формулы класса	класс
When signal X is received, the system shall set the signal X received bit within 2 seconds	ReceivedX.RE	false	true	passed(2s)	true	X_receivedBit	G(ReceivedX.RE → (¬passed(2s) U X_receivedBit))	G(trig → (¬del U rea))	#36A
	If the dryer (D) was not turned on and hands (H) appeared, it will turn on ASAP. If the hands (H) are present and the dryer (D) is on, it will not turn off. If there is no hands (H) and the dryer (D) is not turned on, the dryer will not turn on until the hands appear. If the dryer (D) is on, then it turns off after no hands (H) are present for 1 second. Cyшилка для рук* Description. NL requirement If the dryer (D) was not turned on and hands (H) appeared, it will turn on ASAP. If the hands (H) are present and the dryer (D) is on, it will not turn off. If there is no hands (H) and the dryer (D) is not turned on, the dryer will not turn on until the hands appear. If the dryer (D) is on, then it turns off after no hands (H) are present for 1 second. The time of continuous work of dryer (D) is no more than an hour. POGOT-ПЫЛЕСОС Description. NL requirement ECNIA Сработал СИГНАЛ ПЕРЕПОЛНЕНОЯ ECNIA Сработал СИГНАЛ ПЕРЕПОЛНЕНИЯ ПЫЛЕСБОРНИКА (full), то он (робот-пылесос) должен остановиться (stop = true) и подать звуковой сигнал (sound = true) Systems and software Description. NL requirement When signal X is received, the system shall set the signal X	Pescription. NL requirement If the dryer (D) was not turned on and hands (H) appeared, it will turn on ASAP. If the hands (H) are present and the dryer (D) is on, it will not turn off. If the hands (H) and the dryer (D) is not turned on, the dryer will not turn off. If the dryer (D) is on, then it turns off after no hands (H) are present for 1 second. Cyшилка для рук* Pescription. NL requirement If the dryer (D) was not turned on and hands (H) appeared, it will turn on ASAP. If the hands (H) are present and the dryer (D) is on, it will not turn off. If there is no hands (H) and the dryer (D) is not turned on, the dryer will not turn on until the hands appear. If the dryer (D) is on, then it turns off after no hands (H) are present for 1 second. If the dryer (D) is on, then it turns off after no hands (H) are present for 1 second. Ph. A. D. If the dryer (D) is on, then it turns off after no hands (H) are present for 1 second. D. A. H.FE POGOT-ПЫЛЕСОС Pescription. NL requirement ECAU CPAGOT-ПЫЛЕСОС Description. NL requirement ECAU CPAGOT-ПЫЛЕСОС Systems and software engine Poscription. NL requirement D. RE Poscription. NL requirement Trigger event Poscription. NL requirement Poscription. NL requirement	Description. NL requirement trigger event release event If the dryer (D) was not turned on and hands (H) appeared, it will turn on ASAP. HRE A -D false If the hands (H) are present and the dryer (D) is on, it will not turn off. HAD false If there is no hands (H) and the dryer (D) is not turned on, the dryer will not turn on until the hands appear. HAD false If the dryer (D) is on, then it turns off after no hands (H) are present for 1 second. DAHFE H CYШИЛКА ДЛЯ РУК* Description. NL requirement trigger event release event H HRE A -D false If the dryer (D) was not turned on and hands (H) appeared, it will turn on ASAP. H.RE A -D false If the hands (H) are present and the dryer (D) is on, it will not turn off. HAD D.H >= #TIh If the hands (H) are present and the dryer (D) is not turned on, the dryer (D) is on, then it turns off after no hands (H) are present for 1 second. The time of continuous work of dryer (D) is no more than an hour. DA H.FE H POGOT-ПЫЛСОС Description. NL requirement trigger event event Ecnu cpa6otan сигнал переполнения пылесборника (full), то он (р	Description. NL requirement trigger event event event	Description. NL requirement If the dryer (D) was not turned on and hands (H) appeared, it will turn on ASAP. If the hands (H) are present and the dryer (D) is on, it will not turned on, the dryer will not turn on until the hands appear. If the dryer (D) is on, then it turns off after no hands (H) are present and the dryer (D) is on, it will not turned on, the dryer will not turn on until the hands appear. If the dryer (D) is on, then it turns off after no hands (H) are present for I second. CYШИЛКА ДЛЯ РУК* Description. NL requirement Possed(Is) Description. NL requirement If the dryer (D) was not turned on and hands (H) appeared, it will turn on ASAP. If the dryer (D) is not turned on and hands (H) appeared, it will turn on ASAP. If the advar (D) is not turned on and hands (H) appeared, it will not turn on the dryer (D) is not turned on, the dryer will not turn on until the hands appear. If the dryer (D) is on, then it turns off after no hands (H) are present for I second. The time of continuous work of dryer (D) is no more than an hour. POGOT-ПЫЛЕСОС Description. NL requirement Ecnu cpa6otan curnan nepenonherium пылесборника (full), to on (po6ot-nibunecoc) должен остановиться (stop = true) и подать звуковой сигнал (sound = true) Systems and software engineering standard ISC Description. NL requirement Possed(Is) Description. NL requirement Trigger release final allowable delay All Possed(Is) Possed(Is) Description. NL requirement Possed(Is) Description. NL requirement Possed(Is) Possed(Is)	Description. NL requirement Property Column Colum	Description. NL requirement If the dryer [D] was not turned on and hands (H) appeared, it will turn on ASAP. If the hands (H) are present and the dryer (D) is on, it will not turn off. If the hands (H) and the dryer (D) is not turned on, the dryer (D) is on, it will not turn off. If the hands (H) is on hands (H) and the dryer (D) is not turned on, the dryer (D) is on, the nit turns off after no hands (H) are present and the dryer (D) is not turned on, the dryer will not turn on unril the hands appear. If the dryer (D) is on, then it turns off after no hands (H) are present for 1 second. CYШИЛКА ДЛЯ РУК* Description. NL requirement Passed (Is) Description. NL requirement Passed (Is) True Dry The hands (H) are present and the dryer (D) is on, it will not turn off. If the dryer (D) was not turned on and hands (H) appeared, it will not turn off. If the dryer (D) was not turned on and hands (H) appeared, it will not turn off. The time of continuous work of dryer (D) is not turned on, the dryer will not turn on unril the hands appear. If the dryer (D) is on, then it turns off after no hands (H) are present for 1 second. DA HFE H passed (Is) True T	Description, NL requirement If the dryer (D) was not turned on and hands (H) appeared, it will turn on ASAP. If the hands (H) are present and the dryer (D) is on, it will not make the property of the part o	Description. NL requirement virger vent event e

	Шлюз для воды									
	Description. NL requirement	trigger event	release event	final event	allowable delay	invariant condition	reaction	LTL formula	общий вид формулы класса	класс
1	default	<u>true</u>	false	true	true	true	true	true	true	true
2	Нижние ворота должны быть закрыты если уровни камеры и нижнего бьефа не выровнены	<u>-atLow</u>	false	true	true	¬lowerGate	true	G(¬atLow → ¬lowerGate)	G(trig → inv)	#8
3	Верхние ворота должны быть закрыты если уровни камеры и верхнего бьефа не выровнены	<u>-atHigh</u>	false	true	true	¬upperGate	true	G(¬atHigh → ¬upperGate)	G(trig → inv)	#8
4	Должна быть исключена одновременная подача сигналов на открытие верхних и нижних ворот шлюза	true	false	true	true	¬(upperGate Λ lowerGate)	true	G(¬(upperGate ∧ lowerGate))	G(inv)	#2
5	Должна быть исключена одновременная подача сигналов на верхнего и нижнего клапанов	<u>true</u>	false	true	true	(openHighValv e Λ openLowValve)	true	G(¬(openHighValve ∧ openLowValve))	G(inv)	#2
6	Должна быть открыто только что-то одно, либо одни из ворот, либо один из клапанов	<u>true</u>	false	true	true	-((upperCate A lowerCate) V (upperGate A openHighValve) V (upperGate A openLowValve) V V (lowerCate A openLowValve) V (lowerCate A openLowValve) V (openHighValve A openLowValve)	true	G(¬((upperGate \Lambda\) lowerGate) \(V\) (upperGate \Lambda\) openHighValve) \(V\) (upperGate \Lambda\) openLowValve) \(V\) (lowerGate \Lambda\) openLowValve) \(V\) (openHighValve \Lambda\) openLowValve)))	G(inv)	#2
7	После открытия клапана он закрывается по срабатыванию датчика выравнивания соответствующих уровней	openHighValve.RE	false	atHigh	true	openHighValve	¬openHighValve*	G(openHighValve.RE → (G(openHighValve Λ ¬atHigh) V ((openHighValve Λ ¬atHigh) U (atHigh Λ (openHighValve Λ ¬openHighValve*)))))	$G(trig \rightarrow (G(inv \land \neg fin) \lor ((inv \land \neg fin) \cup (fin \land (inv \land rea))))))$	#22A
8		openLowValve.RE	false	atLow	true	openLowValve	¬openLowValve*	G(openLowValve.RE → (G(openLowValve Λ ¬atLow) V ((openLowValve Λ ¬atLow) U (atLow Λ (openLowValve Λ ¬openLowValve*)))))	$G(trig \rightarrow (G(inv \land \neg fin) \lor ((inv \land \neg fin) \cup (fin \land (inv \land rea)))))$	#22A
9	Через 3 секунды после подачи сигнала на открытие ворот зажигается соответствующий светофор (при наличии в камере корабля – на выход, при отсутствии на вход)	lowerGate.RE A shipInChmbr	false	passed(3s)	true	true	Chmbr2LowLight*	G((lowerGate.RE ∧ shipInChmbr) → (G(¬passed (3s)) V (¬passed(3s) U (passed(3s) ∧ Chmbr2LowLight*))))	G(trig → (G(¬fin) V (¬fin U (fin ∧ rea))))	#29A
10	Светофор гаснет после закрытия соответствующих ворот	lowerGate.FE	false	true	true	true	-Chmbr2LowLight * A -Low2ChmbrLight	G(lowerGate.FE → (¬Chmbr2LowLight* ∧	G(trig → rea)	#1A
11		upperGate.FE	false	true	true	true	¬LC_LH_LED* ∧ ¬LH_LC_LED*	G(upperGate.FE → (¬LC_LH_LED* Λ ¬LH_LC_LED*))	G(trig → rea)	#1A
12	После открытия ворота остаются в открытом состоянии, если не появляется корабль в камере или с противоположной стороны	lowerGate.RE	shipInChmbr V shipInHigh	true	true	lowerGate	true	G(lowerGate.RE → ((shipInChmbr V shipInHigh) V lowerGate))	G(trig → (rel V inv))	#6A