			Ga	meloop.pv					
			9,0	illeloop.py					
				Requirem	ents				
				i+m<12	i+m<11	i+m=12	i+m=12	i+m=11	
				j+n<12	j+n=12	j+n<11	j+n=11	j+n=12	
Inputs			Empty	iRP/jBP/m	iRP/jBP/	iRP/jBP/	iRP/jBP/	iRP/jBP/	Updates
inputs			(Initial State)	RK/nBK	mRK/nBK	mRK/nBK	mRK/nBK	mRK/nBK	<u>opaates</u>
		White			error	1]
		Black(x)	-	error1	error1	error1	error1	error1]
1	Place Red			(i+1)RP	(i+1)RP			(i+1)RP	
1	Piece			iBP	iBP			jBP	
1	Fiece	Black(o)	1RP	mRK	mRK	error2	error2	mRK	1
1				nBK	nBK			nBK	
				HBK	IIBK			& Start]
		White	error1	error1	error1	error1	error1	error1]
		Black(x)	-	error1	error1	error1	error1	error1	Board
	place Blue Piece	Blue	1BP	iRP/ (j+1)BP		iRP/ (j+1)BP mRK	iRP/ (j+1)BP	error2	
				mRK	error2		mRK •		
				nBK		nBK	nBK & Start		
Win		White	error1	error1	error1	error1	error1	error1	-tile matrix
		Black(x)	-	error1	error1	error1	error1	error1	-piece
Board								iRP	matrix
1	Place Red			iRP	iRP			iBP	
1	King	Black(o)	1RK	<u>jBP</u>	<u>jBP</u>	error2	error2	(m+1)RK	1
1				(m+1)RK	(m+1)RK			пВК	
1				nBK	nBK			& Start	
		White	error	error1	error1	error1	error1	error1]
		Black(x)	-	error1	error1	error1	error1	error1]
	Place Blue			iRP		iRP	iRP]
1	King			iBP		jBP	<u>jBP</u>		
1	Killy	Black(o)	1BK	mRK	error2	_	mRK •	error2	
						mRK (= +4)PK	(n+1)BK		
				(n+1)BK		(n+1)BK	& Start]
	Force:	Start	Start	Start	Start	Start	Start	Start]
	Res	et		empty	empty	empty	empty	empty]

Legend

*Table for assignment 3 below

	White	Place this o	n the white t	ile		
	Black(x)	Place this o	n the occupi	ed black tile		
	Black(o)	Place this o	n the unoccu	pied black ti	le	
	error1	Chaw assess	an IICanit al	"		_
			ge "Can't pl			
	error2	Snow messa	ge "Out of p	leces + cum	ent state	
	'board', then	updates 'Bo	ard' with tile	matrix and	piece	
_	matrix. P.Re	<u>dpiece</u> mea	ns clicking th	e button of '	Place Red	
	piece, and [P.BluePiece	P.RedKing a	and P.BlueKi	ing mean	
	clicking each	h button in o	rder. Then, '	ForceStart'a	nd 'Reset'	
	mean clickir	ng Force Star	rt button, and	d Reset butto	n	
	respectively	. Also, each	variable 'i', 'j	', 'm', 'n' is th	e number	
\dashv	of each RP(number of R	ed piece on	the board), E	BP(Blue	
	piece), RK(F	Red King), ar	nd BK(Blue k	(ing). White	orBlack) 🔒	
	means placi	ing the piece	e(or king) on t	the 'White'(or	r Black) tile.	
	The meaning	ng of Black(x)), Black(o), er	ror1, and em	or2 is	
			de of table.			
	P.RedPiece	-Black(o) + E	mpty(Initial	State), playe	r clicks	
	'Place RedF	ieœ'button	and click on	unoccupied	tile of	
	empty board	d. Then there	e is one Red	piece on the	board and	
	it is written a	as 1RP in the	table. In an	y state, press	sing the	
	'force start' b	utton starts t	he game wit	h current stat	te, and	

* The table is only a screenshot as we had trouble exporting it.

The table above illustrates the requirements that must be achieved by each module in terms of a simple interface, note that variables in this chart are not actual variables in the program and instead variables that are simply names used to represent certain functions or states.

		Draw.py			
		Requi	rements		
Inputs					<u>Updates</u>
win b1 b2 b3 b4		the text of t rem	piece', 'pla he button c nains vhite.		text

The table above provides a general decription of what the main function of the draw module.

Note only these interface contains trace backs to requirements as other as they are the only one with huge amount of logic. Other modules simply create additional changes to the interface.

Classes module simply defines behaviour to important objects and will represent the objects in the checkers game

Screen creates the window that the user will use

Main simply links everything together

The table below shows the requirements of module after the game has started.

The table is to be read from left to right. First, the player supposed to drag one of the Red piece, Blue piece, Red king, and Blue king. Then the player choose which tile to drag, for example 'lower white tile on the same row' from the first line of the table below. Depends on whether the tile is empty, empty & bottom/top, or occupied, the game shows different options. Any white tile has error that the player can't drag his/her piece to the tile. Also, any piece or king only can move diagonally to the closest tiles. Red pieces can't be moved to same column or higher column tile and Blue pieces can't be moved to same column or lower column. However Kings can go either lower or higher unless it's occupied or white. For one special case, as the Red piece arrives to empty black bottom tile, it becomes a Red king, also Blue piece becomes Blue king when it's at empty black top tile. The other case is when there is a blue piece where red piece tries to get(which is diagonal for sure), the red piece can jump the blue piece so it arrives to the next diagonal black tile and the blue piece is removed(it is stated as "Good move" on the table). However when there is same red piece, it can't jump with error4("same team"). It's stated on the right side of the table "between the piece and the tile where the player dragged to, there is a red/blue piece/king. 'error1' means the player can't move the piece/king since it's not diagonal. 'error2' means the player can't move the piece/king it's white tile. 'error3' means the player can't move the piece/king since there's no one to kill.

Gameloop.py

	_				tile			Between the piec	e and the tile where gged to, there is a	
inputs		column			empty	empty and the bottom	occupied	red pice/king	blue piece/king	Updates
			white	on the same row	е	rror1				
			WINC	else	е	rror2			-	
	Drag	lower		1 diagonal	move	Red King	nothing			
	Red	lower	black	2 diagonal	error3	Red King	nouning	error4	Good move	1
	Piece to		Diaok	on the same row		rror1				
				else	nc	thing			_	
		same or higher	white black		nothi	ng				
			Γ	on the same row	е	rror1				
			white	else	е	rror2			_	
				1 diagonal	n	nove				
		lower		2 diagonal		rror3	nothing	error4	Good move	1
			black	on the same row		rror1				
				else	nc	othing				
	Drag Red		white					1		
	King	same	black		nothi	ng			-	
	to			on the same row		error1		1		
			white	else		error2				
	high			1 diagonal		move				
		higher	l	2 diagonal		error3	nothing	error4	Good move	1
			black	on the same row		error1			•	
				else	n	othing			-	
		•								Board
win					tile				ce and the tile where gged to, there is a	-tile matrix
board		column			empty	empty and the top	the tile is occupied	red pice	blue piece	-piece matrix
		lower or same	white black		nothi	ng				matrix
	Drog			on the same row		error1			-	
	Drag Blue		white	else		error2				
	Piece	la la de a se		1 diagonal	move	Blue King				
	to	higher		2 diagonal	error3	Blue King	nothing	good move	error4	
			black	on the same row		error1				
				else	n	othing			-	-
				on the same row	1 .	error1				1
			white	else		error2			_	
				1 diagonal		move				
		lower		2 diagonal	+	error3	nothing	good move	error4	1
			black	on the same row		error1			•	1
	Drag			else	n	othing]		
	Blue	aama	white		nothi	n a				
	King	same	black		nothi	<u>.</u>	.		-	
	ιιο			I 41	1 6	error1				1
	to		white	on the same row						
	10		white	else		error2				
	10	higher	white	else 1 diagonal	•	error2 move	nothing	good may re	0,555.4	
	10	higher	white black	else 1 diagonal 2 diagonal	6	error2 move error3	nothing	good move	error4	
	10	higher		else 1 diagonal	(error2 move	nothing	good move	error4	

Gameloop.py

				_				_				
						tile				the piece and the eyer dragged to,		
puts			column			empty	empty and the bottom	oc cup ied	Red Piece	Blue Piece (Only one blue piece/king left on the board)	Bue Piece (There are more than one blue left piece/king on the board)	Updates
	inial state/ Red piece/king just moved		low er/ same/ higher	w hite/ black	any tile				nothing			
		Drag		w hite	on the same row		error1					
	233	Red Piece			else 1 diagonal		Red King					
	Blue piece/king just	to	low er	Mart	2 diagonal		Red King	nothing	error4	Red w in!	good move	
	moved December 1			black	on the same row		error1					
		1	same or	w hite	else	10.00	othing			-		
				black		nothi	ng					
					There is at	easto	ne Red King	on the boa	ard			
	Red piece/king		low en/	w hite/	St. Republication of				74.530555			
	just moved		same/ higher	black	any tile				nothing			
	March 2 Const		nigner		on same row	-	error1					
				w hite	else		error2					
			low er		1 diagonal		move	nothing				
		Drag	130.20	black	2 diagonal	_	error3	inothing.	error4	Red w in!	good move	
	184850	Red			on the same row else		error1 othing	3				
	Blue	King		w hite	eise							
	piece/king just	ь	same	black		nothi	ng					
	moved				on same row		error1					
	moved	1		tar bitte			error2					
	moved			w hite	else							
	moved		higher		1 diagonal		move	nothing	error4	Red w in!	good move	
	moved		higher	w hite black		6		nothing	error4	Red w in!	good move	
	moved		higher		1 diagonal 2 diagonal on the same row	6	move error3 error1	nothing	error4	Red w in!	good move	
rin	moved		higher		1 diagonal 2 diagonal on the same row	6	move error3 error1	nothing	Between the		w here the player	
	moved		higher		1 diagonal 2 diagonal on the same row	e e n	move error3 error1 othing	the tile is	Between the	piece and the tile dragged to, there Red Piece (There are more than one Red piece/king left	w here the player is a	
	Bue		column low er/	black	1 diagonal 2 diagonal on the same row else	tile	error3 error1 othing	the tile is	Between the Red piece (Only one Red piece/king left on the board)	piece and the tile dragged to, there Red Piece (There are more than one Red piece/king left	w here the player is a	-tile mat -pie ce
			column	black	1 diagonal 2 diagonal on the same row	tile	error3 error1 othing	the tile is	Between the Red piece (Only one Red piece/king left	piece and the tile dragged to, there Red Piece (There are more than one Red piece/king left	w here the player is a	-tile mat -pie ce
	Blue piece/king just	Drag	column low et/ same/	black	1 diagonal 2 diagonal on the same row else	tile empty	empty and	the tile is	Between the Red piece (Only one Red piece/king left on the board)	piece and the tile dragged to, there Red Piece (There are more than one Red piece/king left	w here the player is a	-tile mat -pie ce
	Blue piece/king just	Drag Blue	column low er/ same/ higher	black	1 diagonal 2 diagonal on the same row else	tile empty	empty and the top	the tile is	Between the Red piece (Only one Red piece/king left on the board)	piece and the tile dragged to, there Red Piece (There are more than one Red piece/king left	w here the player is a	-tile mat -pie ce
	Blue piece/king just moved	Blue Piece	column low er/ same/ higher low er or	black w hite/black w hite	1 diagonal 2 diagonal on the same row else any tile on the same row	tile empty	empty and the top	the tile is	Between the Red piece (Only one Red piece/king left on the board)	piece and the tile dragged to, there Red Piece (There are more than one Red piece/king left	w here the player is a	-tile mat -pie ce
	Blue piece/king just moved Initial state/ Red piece/king	Blue Piece	oolumn low er/ same/ higher low er or same	w hite/black	1 diagonal 2 diagonal on the same row else any tile on the same row else	tile empty	empty and the top	the tile is occupied	Between the Red piece (Only one Red piece/king left on the board)	piece and the tile dragged to, there Red Piece (There are more than one Red piece/king left	w here the player is a	-tile mat -pie ce
	Blue piece/king just moved	Blue Piece	column low er/ same/ higher low er or	w hite/ black w hite black w hite	1 diagonal 2 diagonal on the same row else any tile on the same row	tile empty	empty and the top	the tile is	Between the Red piece (Only one Red piece/king left on the board)	piece and the tile dragged to, there Red Piece (There are more than one Red piece/king left	w here the player is a	-tile mat -pie ce
	Blue piece/king just moved Initial state/ Red piece/king	Blue Piece	oolumn low er/ same/ higher low er or same	w hite/black	any tile on the same row else on the same row else on the same row else dagonal 2 dagonal on the same row on the same row	tile empty	empty and the top	the tile is occupied	Between the Red piece (Only one Red piece/king left on the board) nothing	piece and the tile dragged to, there Red Piece (There are more than one Red piece/king left on the board)	w here the player is a e Blue Plece	-tile mat -pie ce
	Blue piece/king just moved Initial state/ Red piece/king	Blue Piece	oolumn low er/ same/ higher low er or same	w hite/ black w hite black w hite	any tile on the same row else on the same row else on the same row else diagonal 2 diagonal 2 diagonal on the same row else	tile empty noth	empty and the top error1 error2 Blue King Blue King error1 othing	the tile is occupied	Between the Red piece (Only one Red piece/king left on the board) nothing	piece and the tile dragged to, there Red Piece (There are more than one Red piece/king left on the board)	w here the player is a e Blue Plece	-tile mat -pie ce
	Blue piece/king just moved Initial state/ Red piece/king	Blue Piece	oolumn low er/ same/ higher low er or same	w hite/black w hite black w hite	any tile on the same row else on the same row else on the same row else diagonal 2 diagonal 2 diagonal on the same row else	tile empty noth	empty and the top	the tile is occupied	Between the Red piece (Only one Red piece/king left on the board) nothing	piece and the tile dragged to, there Red Piece (There are more than one Red piece/king left on the board)	w here the player is a e Blue Plece	-tile mat -pie ce
	Blue piece/king just moved Initial state/ Red piece/king just moved	Blue Piece	oolumn low er/ same/ higher low er or same	w hite/ black w hite black w hite	any tile on the same row else on the same row else on the same row else diagonal 2 diagonal 2 diagonal on the same row else	tile empty noth	empty and the top error1 error2 Blue King Blue King error1 othing	the tile is occupied	Between the Red piece (Only one Red piece/king left on the board) nothing	piece and the tile dragged to, there Red Piece (There are more than one Red piece/king left on the board)	w here the player is a e Blue Plece	-tile mat -pie ce
	Blue piece/king just moved Initial state/ Red piece/king just moved Blue piece/king just	Blue Piece	column low er/ same/ higher low er or same higher	w hite/black w hite black w hite black w hite	any tile on the same row else on the same row else on the same row else 1 diagonal 2 diagonal on the same row else There is at any tile on the same row on the same row else	noth move error3	empty and the top error1 error2 Blue King error1	the tile is occupied	Between the Red piece (Only one Red piece/king left on the board) nothing Blue w in!	piece and the tile dragged to, there Red Piece (There are more than one Red piece/king left on the board)	w here the player is a e Blue Plece	-tile mat -pie ce
	Blue piece/king just moved Initial state/ Red piece/king just moved Blue piece/king just	Blue Piece	column low er/ same/ higher low er/ same/ higher	w hite/black w hite black w hite black	any tile on the same row else on the same row else on the same row else 1 diagonal 2 diagonal on the same row else There is at any tile on the same row else	noth move error3	empty and the top error1 error2 Blue King Blue King error1 error2	the tile is occupied nothing on the bo	Between the Red piece (Only one Red piece/king left on the board) nothing Blue w in!	piece and the tile dragged to, there Red Piece (There are more than one Red piece/king left on the board)	w here the player is a e Blue Plece	-tile mat -pie ce
	Blue piece/king just moved Initial state/ Red piece/king just moved Blue piece/king just	Blue Piece to	column low er/ same/ higher low er or same higher	w hite/black w hite black w hite black w hite black	any tile on the same row else on the same row else on the same row else 1 diagonal 2 diagonal on the same row else There is at any tile on the same row else 1 diagonal	noth move error3	empty and the top error1 error2 Blue King error1	the tile is occupied	Between the Red piece (Only one Red piece/king left on the board) nothing Blue w in!	piece and the tile dragged to, there Red Pece (There are more than one Red piece/king left on the board)	w here the player is a Blue Piece	-tile mat -pie ce
	Blue piece/king just moved Initial state/ Red piece/king just moved Blue piece/king just	Blue Piece to	column low er/ same/ higher low er/ same/ higher	w hite/black w hite black w hite black	any tile on the same row else on the same row else on the same row else 1 diagonal 2 diagonal on the same row else There is at any tile on the same row else	noth move error3	emove error3 error1 othing empty and the top ing error1 error2 Blue King error1 othing ne Blue King error1 othing	the tile is occupied nothing on the bo	Between the Red piece (Only one Red piece/king left on the board) nothing Blue w in!	piece and the tile dragged to, there Red Piece (There are more than one Red piece/king left on the board)	w here the player is a e Blue Plece	-tile mat -pie ce
	Blue piece/king just moved Initial state/ Red piece/king just moved Blue piece/king just moved	Blue Piece to	column low er/ same/ higher low er/ same/ higher	w hite/black w hite black w hite black w hite black w hite black	any tile on the same row else on the same row else on the same row else 1 dagonal 2 diagonal on the same row else There is at any tile on the same row else 1 diagonal 2 diagonal 2 diagonal	noth move error3	empty and the top empty and the top ing error1 error2 Blue King error1 cothing ne Blue King error1 cothing	the tile is occupied nothing on the bo	Between the Red piece (Only one Red piece/king left on the board) nothing Blue w in!	piece and the tile dragged to, there Red Pece (There are more than one Red piece/king left on the board)	w here the player is a Blue Piece	-tile mat -pie ce
	Blue piece/king just moved Initial state/ Red piece/king just moved Blue piece/king just	Blue Piece to Drag Blue	column low er/ same/ higher low er/ same/ higher	w hite/black w hite black	any tile on the same row else on the same row else on the same row else 1 dagonal 2 dagonal on the same row else There is at any tile on the same row else dagonal on the same row else 1 dagonal on the same row else 1 dagonal on the same row else	noth move error3	emove error3 error1 othing empty and the top ing error1 error2 Blue King error1 othing ne Blue King error1 othing ne Blue King error1 othing ne Blue King error1 othing	the tile is occupied nothing on the bo	Between the Red piece (Only one Red piece/king left on the board) nothing Blue w in!	piece and the tile dragged to, there Red Pece (There are more than one Red piece/king left on the board)	w here the player is a Blue Piece	-tile mat -pie ce
	Blue piece/king just moved Initial state/ Red piece/king just moved Blue piece/king just moved	Blue Piece to Drag Blue King	column low er/ same/ higher low er or same low er/ same/ higher low er	w hite/black w hite black w hite black w hite black w hite black w hite	any tile on the same row else on the same row else on the same row else 1 diagonal 2 diagonal on the same row else There is at any tile on the same row else 1 diagonal 2 diagonal on the same row else 1 diagonal 2 diagonal on the same row else	noth move error3	emove error3 error1 othing empty and the top ing error1 error2 Blue King error1 othing ne Blue King error1 othing ne Blue King error1 othing ne Blue King error1 othing	the tile is occupied nothing on the bo	Between the Red piece (Only one Red piece/king left on the board) nothing Blue w in!	piece and the tile dragged to, there Red Pece (There are more than one Red piece/king left on the board)	w here the player is a Blue Piece	-tile mat -pie ce
	Blue piece/king just moved Initial state/ Red piece/king just moved Blue piece/king just moved	Blue Piece to Drag Blue King	column low er/ same/ higher low er or same low er/ same/ higher low er	w hite/black w hite black	any tile on the same row else on the same row else on the same row else 1 dagonal 2 dagonal on the same row else There is at any tile on the same row else 1 dagonal on the same row else 1 dagonal on the same row else 1 dagonal on the same row else on the same row else	noth move error3	empty and the top empty and the top empty and the top empty and the top Blue King Blue King error1 orthing error1 orthing error1 orthing error1 error2 move error3 error1 orthing ing error1 error2 error1 orthing ing error1 error2	the tile is occupied nothing on the bo	Between the Red piece (Only one Red piece/king left on the board) nothing Blue w in!	piece and the tile dragged to, there Red Pece (There are more than one Red piece/king left on the board)	w here the player is a Blue Piece	-tile mat -pie ce
	Blue piece/king just moved Initial state/ Red piece/king just moved Blue piece/king just moved	Blue Piece to Drag Blue King	column low er/ same/ higher low er or same low er/ same/ higher low er	w hite/black w hite black w hite black w hite black w hite black w hite	any tile on the same row else on the same row else on the same row else 1 diagonal 2 diagonal 3 diagonal on the same row else There is at any tile on the same row else 1 diagonal 1 diagonal on the same row else 1 diagonal on the same row else 1 diagonal on the same row else 1 diagonal	noth move error3	empty and the top empty and the top empty and the top empty and the top Blue King error1 error2 Blue King error1 error3 error1 error3 error1 error3 error1 entror3 error1 entror4	the tile is occupied nothing on the bo	Between the Red piece (Only one Red piece/king left on the board) nothing Blue w in!	piece and the tile dragged to, there Red Piece (There are more from the none Red piece/king left on the board) good move	w here the player is a Blue Piece	-tile mat -pie ce
v in	Blue piece/king just moved Initial state/ Red piece/king just moved Blue piece/king just moved	Blue Piece to Drag Blue King	oolumn low er/ same/ higher low er or same higher low er/ same/ higher low er same/	w hite/black w hite black w hite black w hite black w hite black w hite	any tile on the same row else on the same row else on the same row else 1 dagonal 2 dagonal on the same row else There is at any tile on the same row else 1 dagonal on the same row else 1 dagonal on the same row else 1 dagonal on the same row else on the same row else	nothing move error3	empty and the top empty and the top empty and the top empty and the top Blue King Blue King error1 orthing error1 orthing error1 orthing error1 error2 move error3 error1 orthing ing error1 error2 error1 orthing ing error1 error2	the tile is occupied nothing on the bo	Between the Red piece (Only one Red piece/king left on the board) nothing Blue w in!	piece and the tile dragged to, there Red Pece (There are more than one Red piece/king left on the board)	w here the player is a Blue Piece	-tile matr

The table above is pretty much same as the table from assignment 2 which describes the movement of pieces on the board. However this one also shows 1)only Blue piece can start from the initial state (the state than none of the piece made a movement), 2) when every Blue piece/King removed, Red wins, and 3) when every Red piece/King removed, then Blue wins. If it is PVP mode then whole table is describing the game, or if it is Blue(or Red) vs computer, part of the colour which player is playing is describing the player's movement.