#RBAC policy mining

Input:

1) Subject attribute matrix - can consider this as a non-boolean matrix, but for sake of simplicity better to consider as a boolean matrix.

	$sa_1 - v_1$	$sa_1 - v_2$	$sa_2 - v_4$	...
s_1	1	0	1	1
s_2	.	.	.	.
s_3				
:				

rows are subjects, columns are subject attribute-value pairs.

Let sa_1 be a subject-attribute and let it have values v_1, v_2 and v_3.

So in the matrix, there will be 3 columns - $sa_1 - v_1$, $sa_1 - v_2$, $sa_1 - v_3$

Similarly, there will be other columns for more such pairs.

2) Object-attribute matrix

boolean matrix, rows are objects, columns are object-attribute-value pairs.

3) Environmental-attribute matrix

Optional, may not consider

boolean matrix, rows are environmental conditions, columns are environmental attribute-value pairs

Output

A set of rules constituting a policy.

Policy is represented as a boolean matrix. Rows are rules, columns are subject attribute-value pairs, object attribute-value pairs, environmental attribute-value pairs & operations.

	sa_1-v_1	sa_1-v_2	sa_2-v_1	sa_2-v_2	oa_1-v_1	
r_1	1	1	0	0	0	1
r_2	-	-	-		-	

So each rule is interpreted as if a subject has some values for some attributes and an object has some values for some attributes and some environmental conditions have some values, then some operations are allowed to be performed by the subject on the object.

eg: If a subject is a Professor, then s/he can access the answer scripts of students.

SA = { designation, department }
subject attribute set

OA = { assignments, answer scripts }
object-attribute set

	design-TA	design-Prof	dept-CS	dept-ECE	assign-t
γ_1	0	1	1	1	0

Here, possible values of designation attribute is TA and Professor. Possible values of department is CS and ECE. Possible values of assignment - online & offline (types). Possible values of answer scripts

attribute — midsem and compre. Here, environment conditions are not considered. Operations are also omitted since only access and no-access operations are considered. If operations are like read, edit, delete, add, etc., then each type of operation has to be shown as a matrix column.

(may refer to Sadhana's papers for a better example)

line	assign-offline	ans-midsem	ans-compre
	0	1	1