



Product Design and Development

Project II

Design coin sorter

Instructor: Dr. Pisut Koomsap

Group 1:

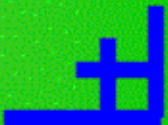
Ta Manh Thang

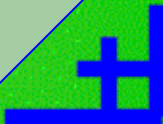
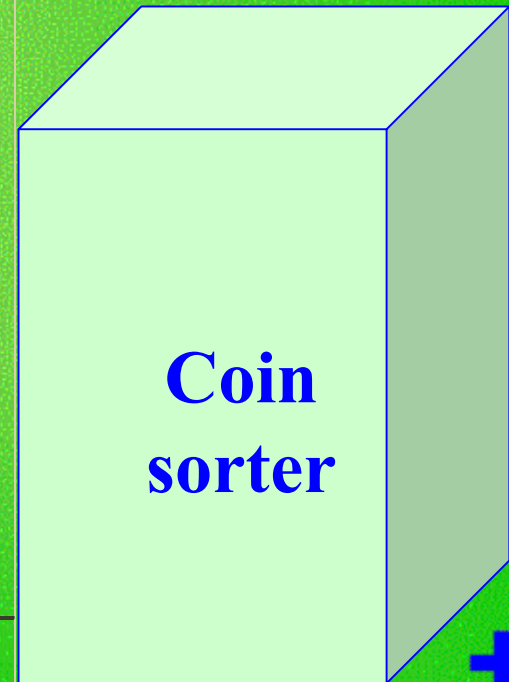
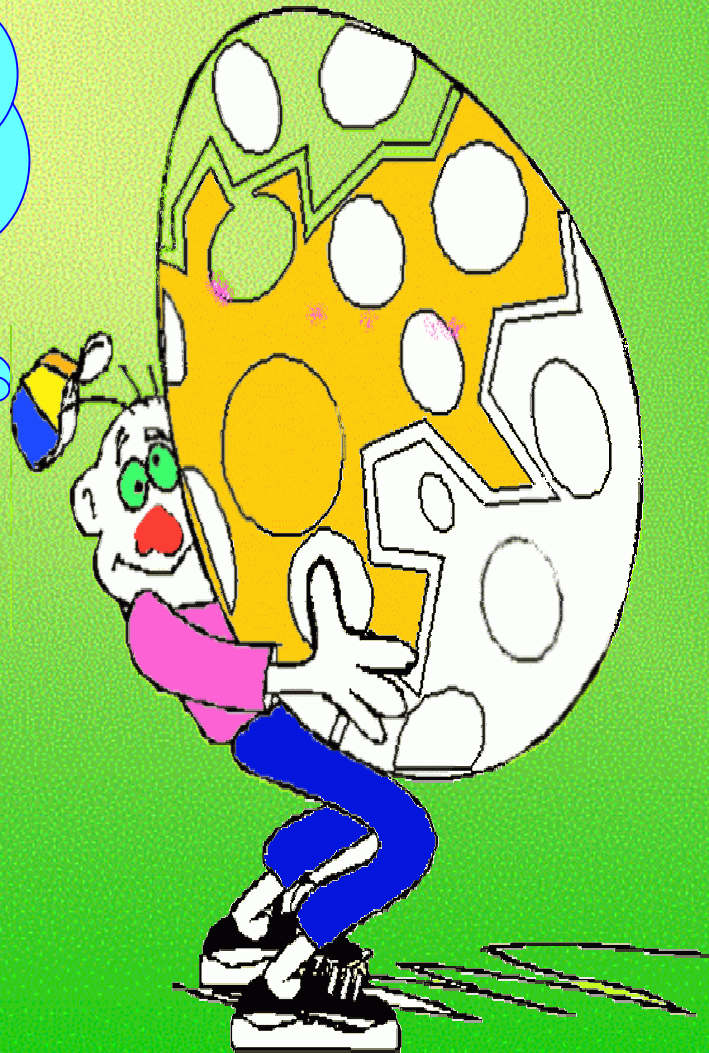
Nhu Quy Tho

Nguyen Viet Tiep

Phung Quang Khai

Nguyen Xuan Son







Use conveyor ?!

Use swivel
arm ?!

Use electric
energy ?!

Sharpe ?!

GROUP

Portable?!

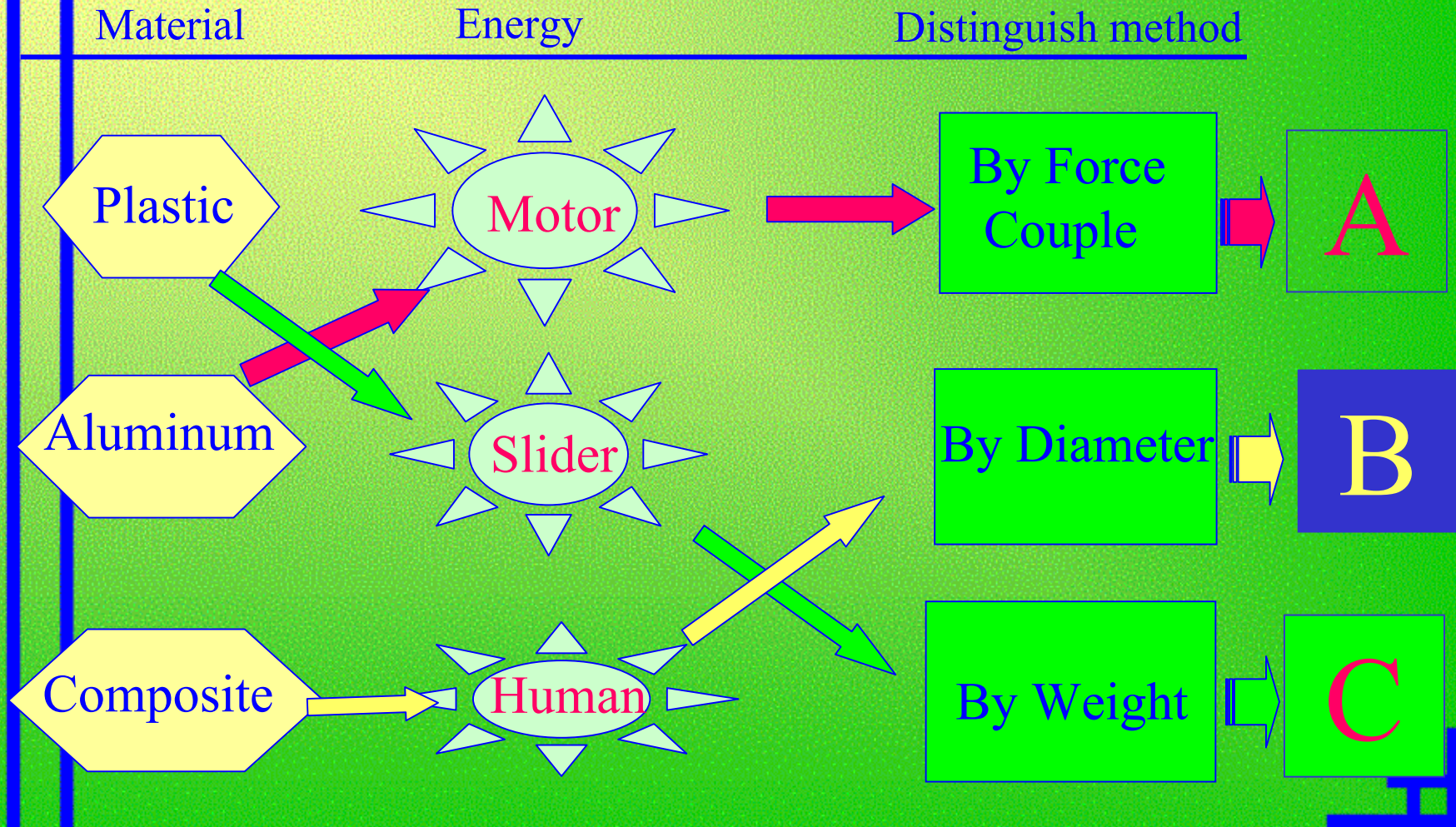
Distinguished
properties

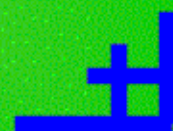
Plastic or others
?!





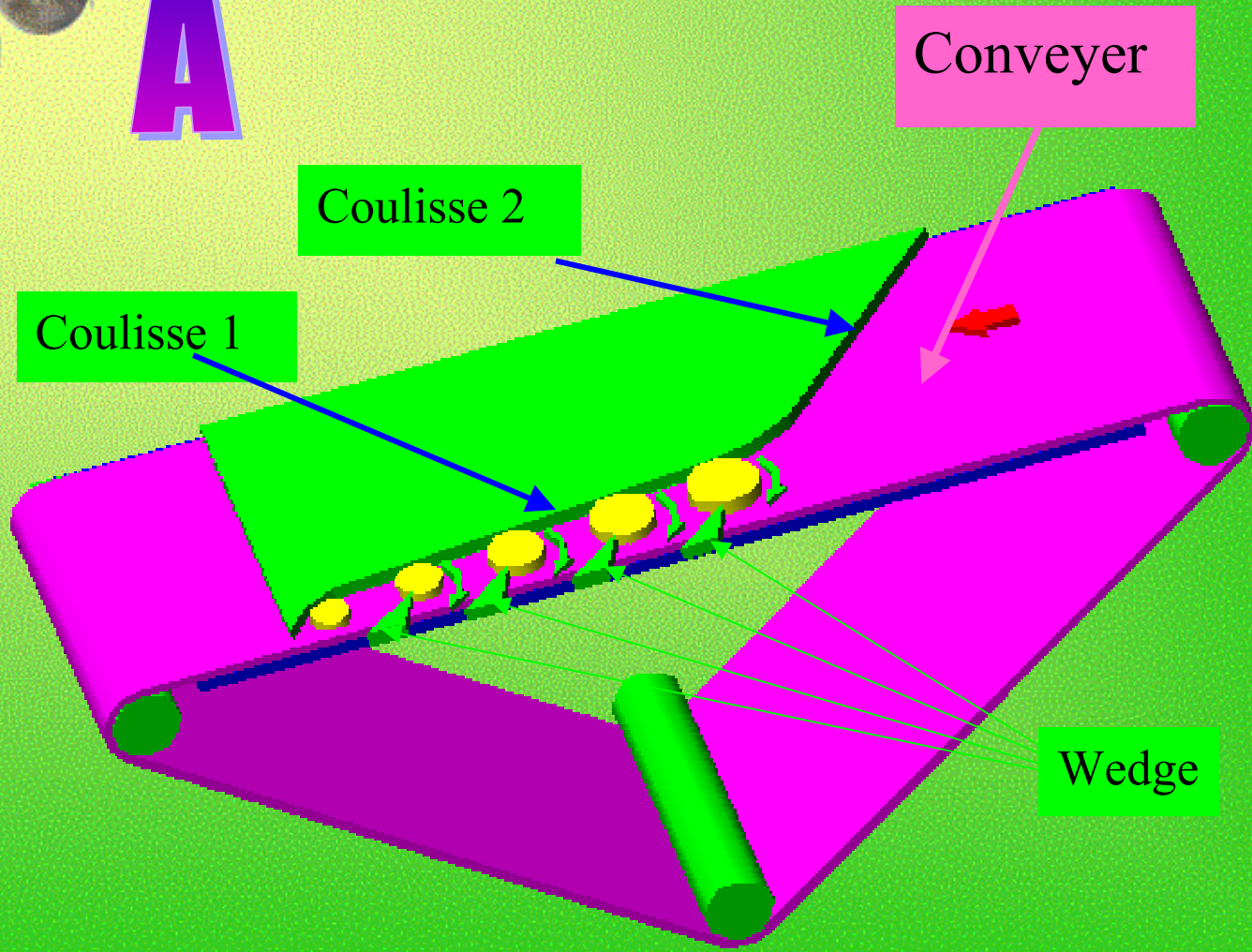
Combination





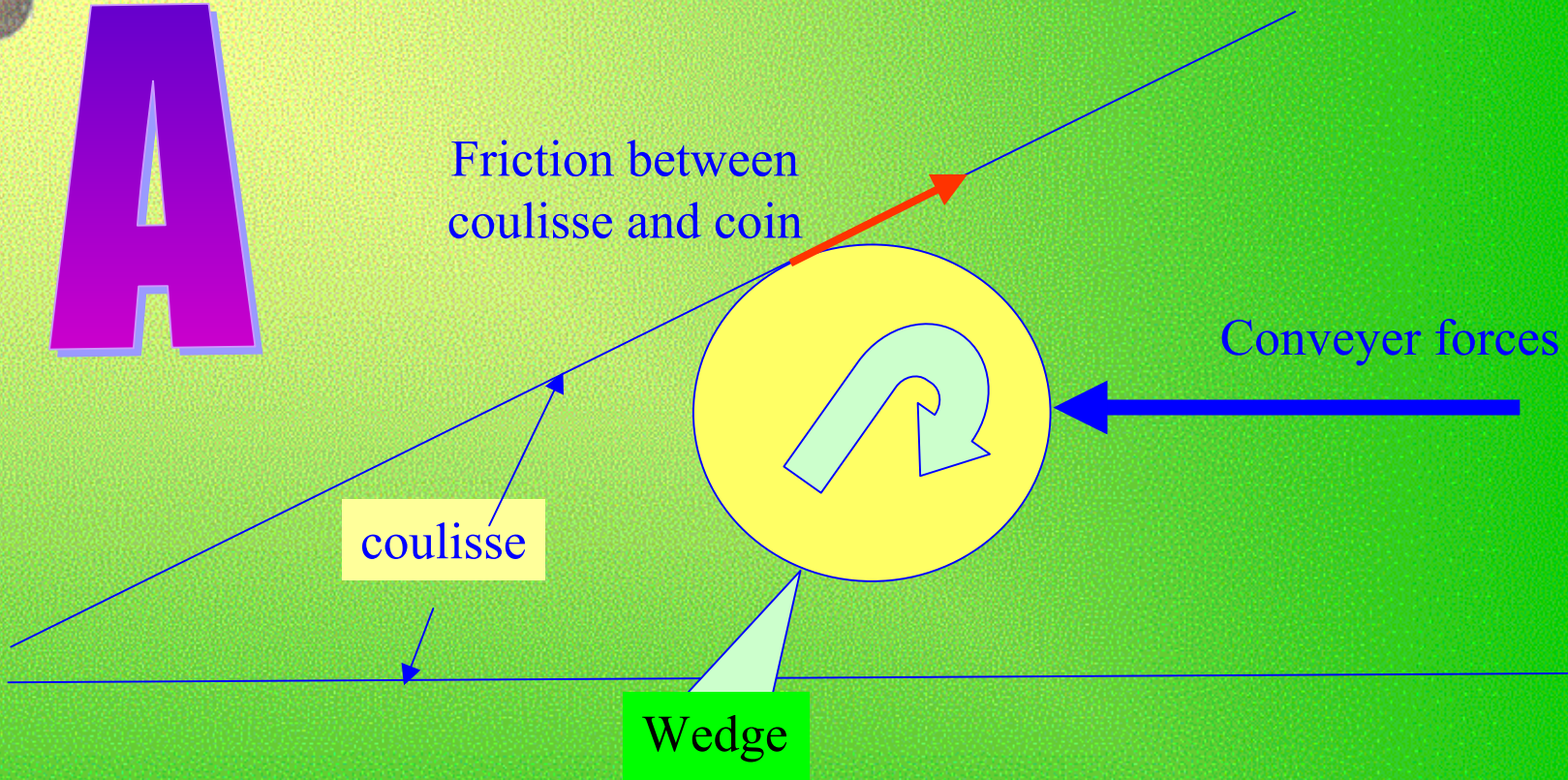


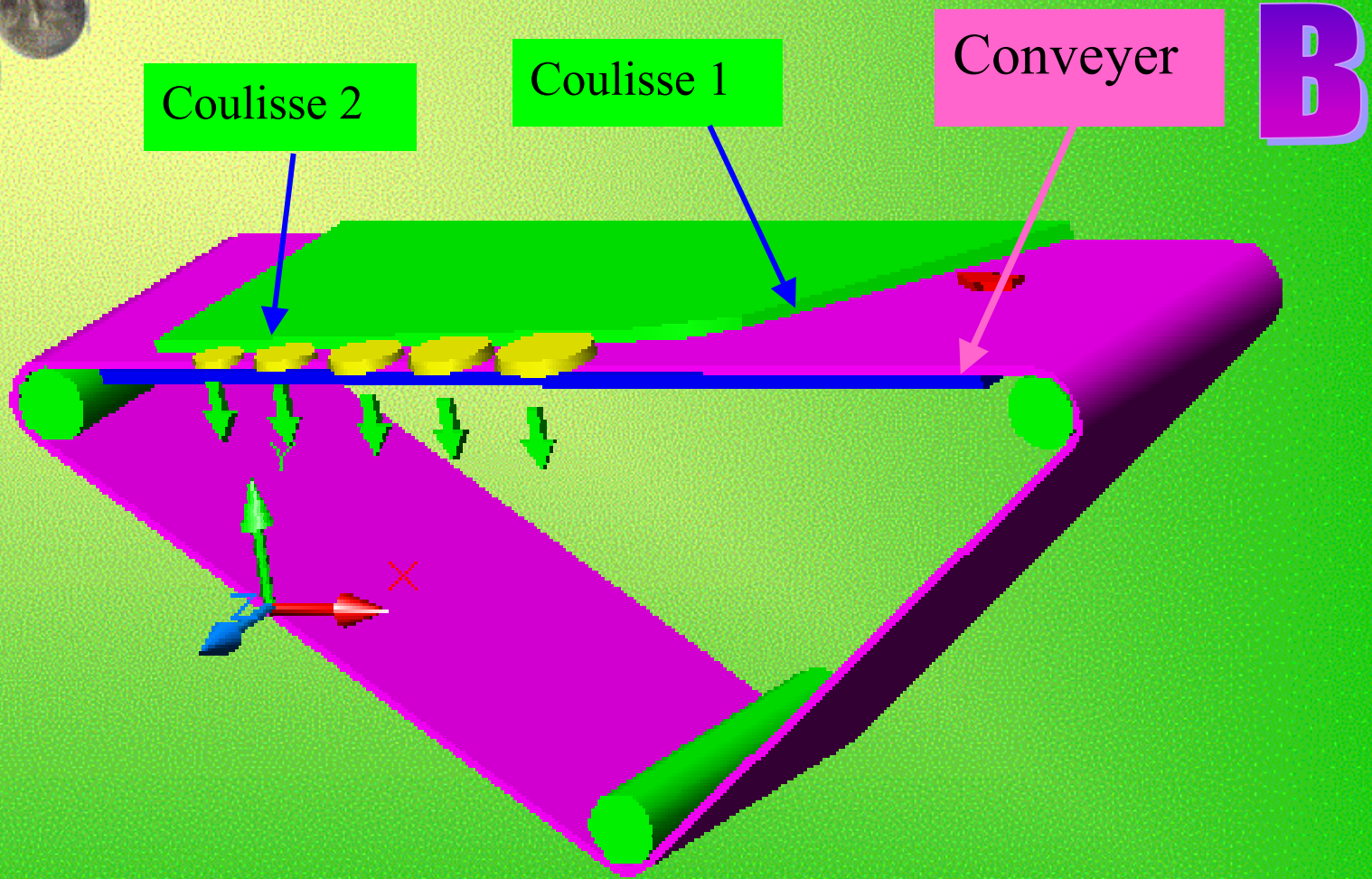
A





A





Coulisse 2

Coulisse 1

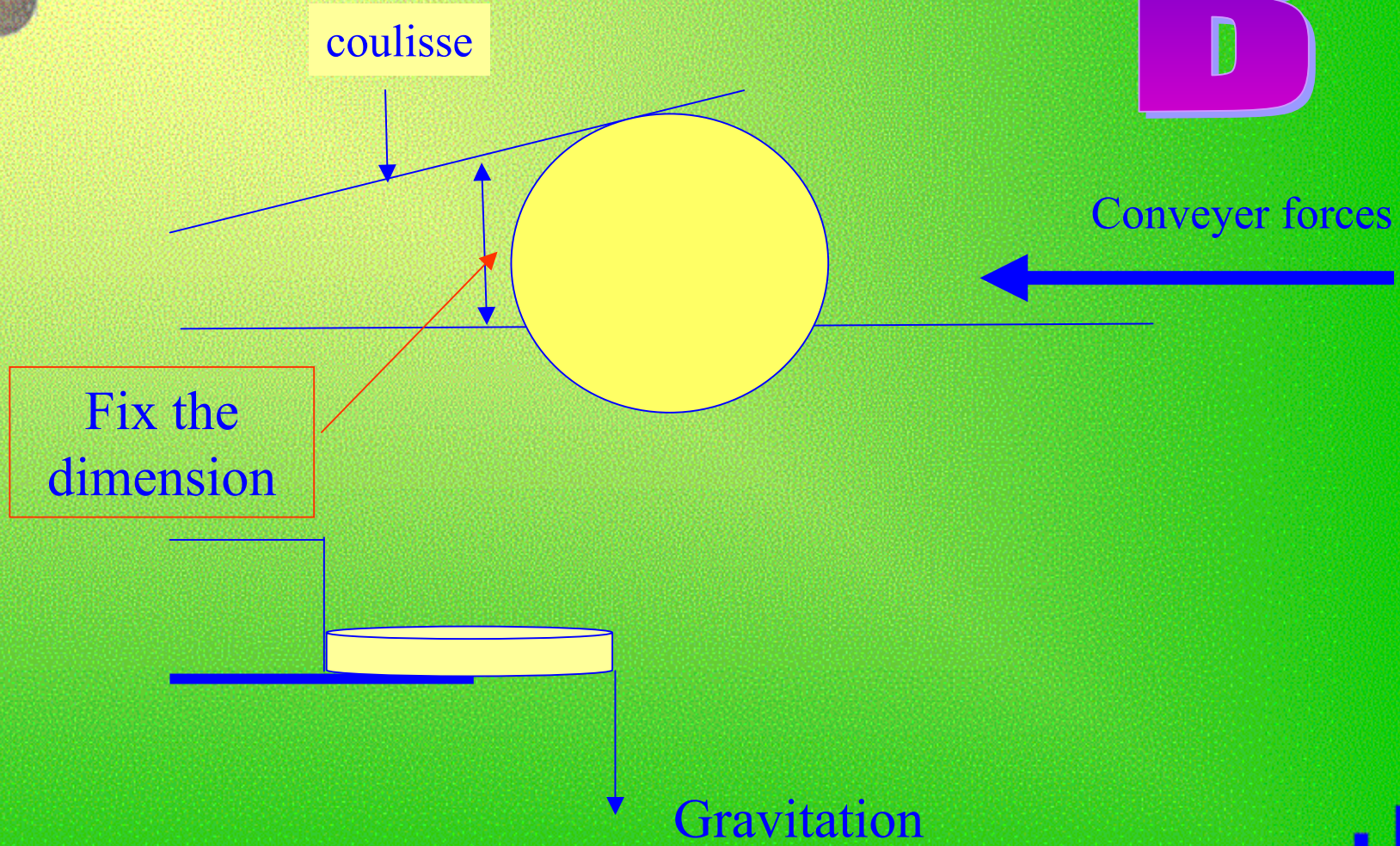
Conveyer

B



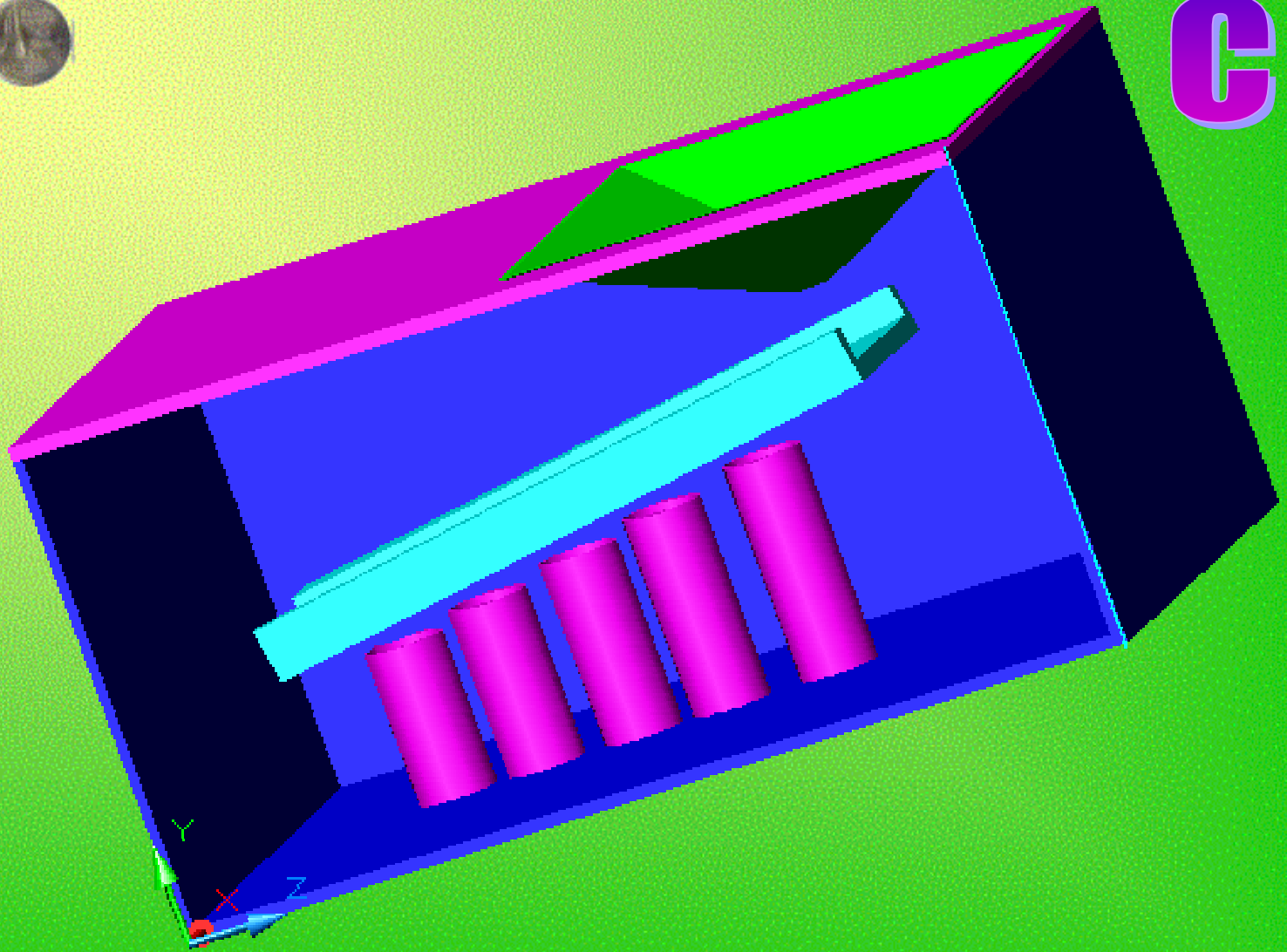


B



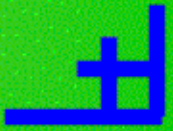
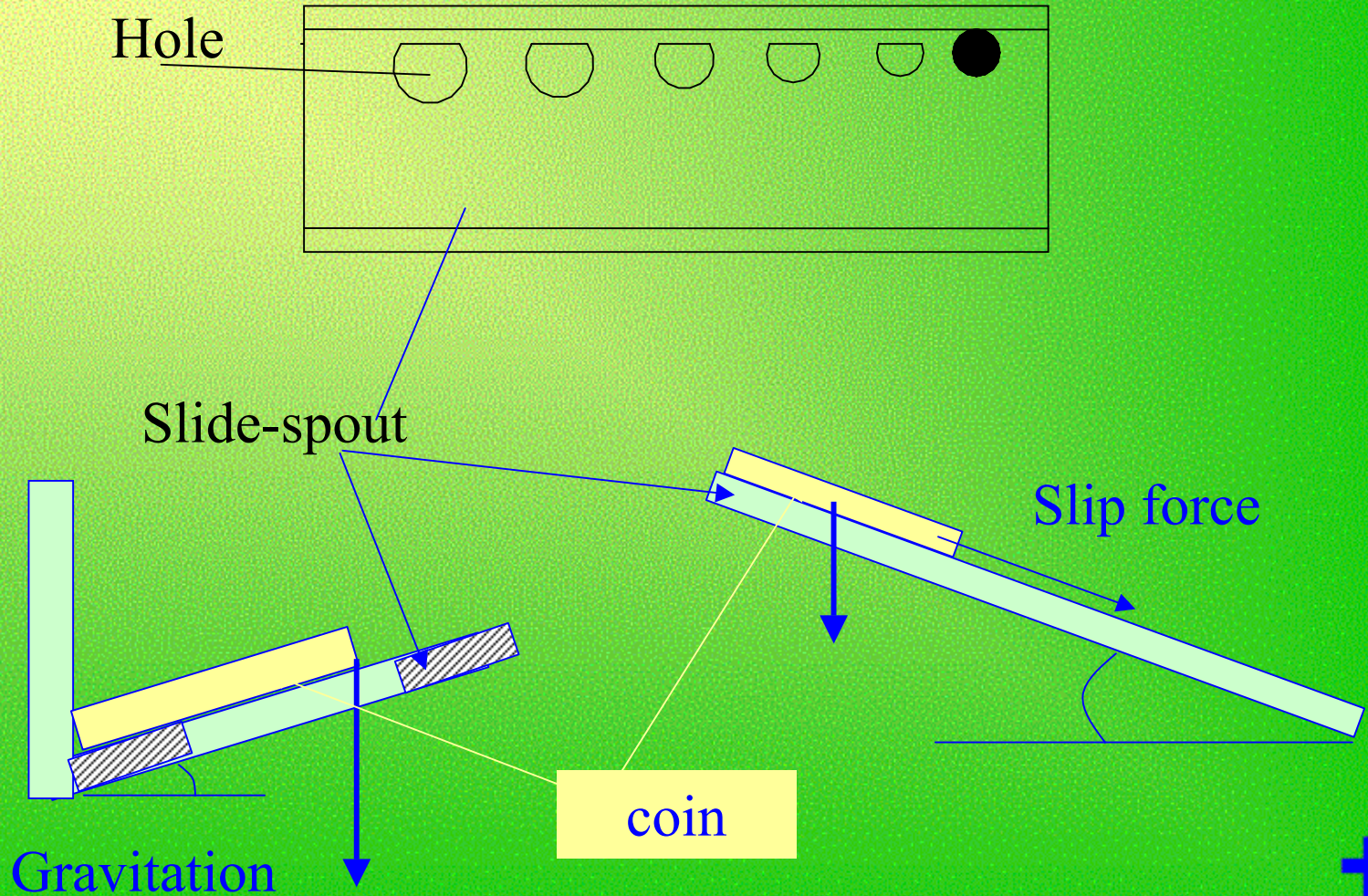


C





Principle





Concept selection

Scoring table

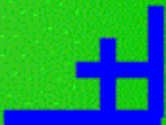
Selection criteria	Weigh %	Concepts					
		A		B		C	
		Rating	Weighted score	Rating	Weighted score	Rating	Weighted score
Easy to use	10	3	0.3	4	0.4	4	0.4
Light confidence accurate	30	4	1.2	4	1.2	5	1.5
Not stuck	15	3	0.45	4	0.6	3	0.45
Nice to see	10	3	0.3	3	0.3	4	0.4
Simple structure	10	4	0.4	3	0.3	3	0.3
Popular material	15	3	0.45	4	0.6	4	0.6
Protability	10	4	0.4	4	0.4	4	0.4
Total score			3.5		3.8		4.05
Rank			3		2		1
Continue ?		No		No		Yes	

Choosing parameters

- Material : Plastic
- Energy Generation: coin weight
- Sorting method : diameter
- Dimension :

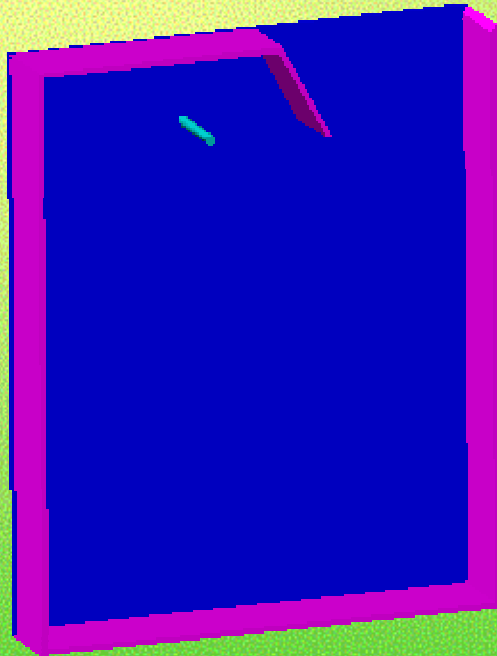
HxWxT : 50x30x15 cm

Angle of slider : 10°

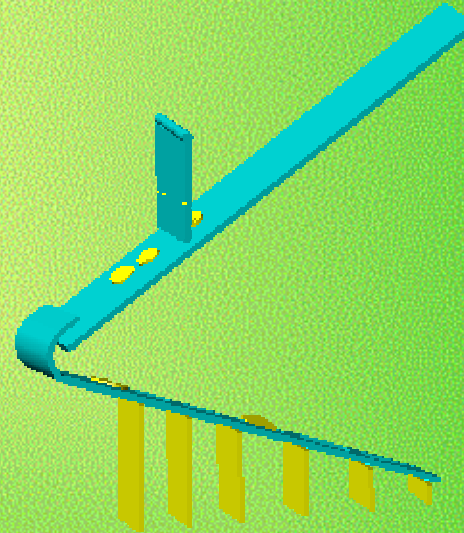




Components



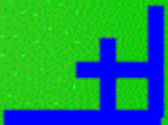
Body

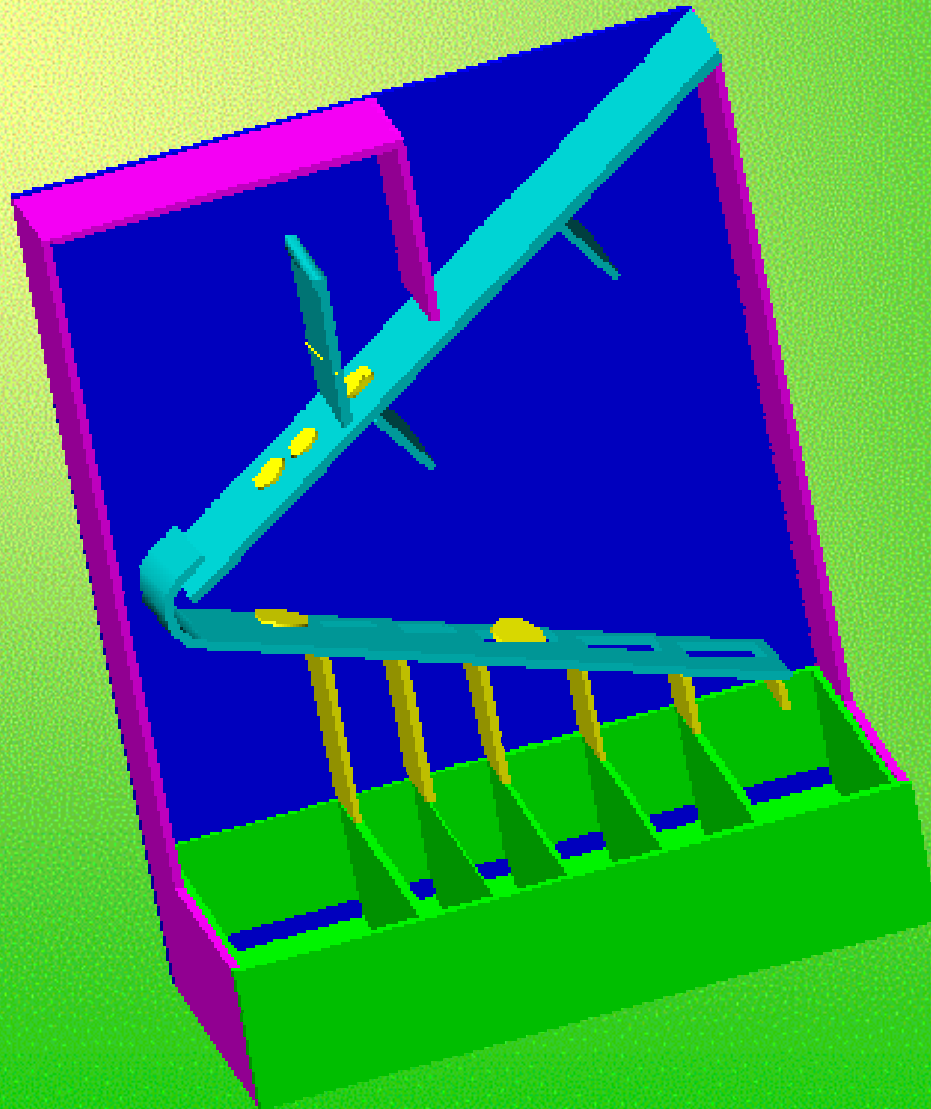


Sorter

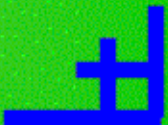


Tray





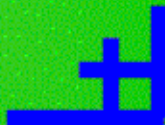
3D - model





Testing

Angle (degree)	No of trials (times)	No of coins (coins)	Time process (second)	Accuracy
10	10	1	10	70%
10	10	15	20	65%
15	10	1	10	85%
15	10	15	25	80%
20	10	1	10	98%
20	10	15	20	85%
25	10	1	10	75%
25	10	15	25	70%
30	10	1	15	75%
30	10	15	20	65%





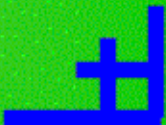
Faced problems

-Not enough kinetic energy

- +when sliding angle is small (from 10° to 15°)
- +when slider length is short

-Pass over the holes

- + when sliding angle is large such as 25° to 30°
- + when increasing the number of coins





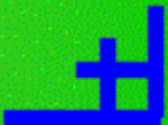
Faced problems

-Coins flow in multi rows

- +with the basic model, without slider declination
- +when slider length is short
- +with large number of coins

-Getting stuck

- + Bottle neck
- + Heap up
- + Cling





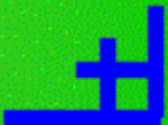
Solutions

Choosing appropriate sliding angle

Solving problem: - enough energy
 - pass over the holes

Choosing From Testing table

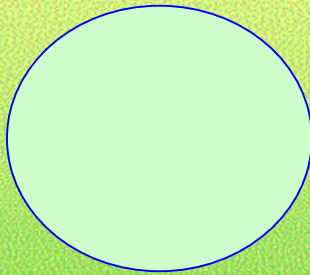
- Small angle : not enough energy
- Large angle : pass over
- Suitable angle: 20° (by try and error)



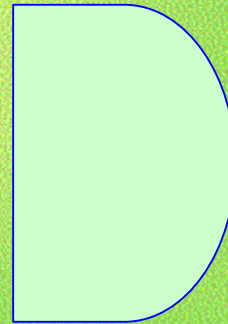


Solutions

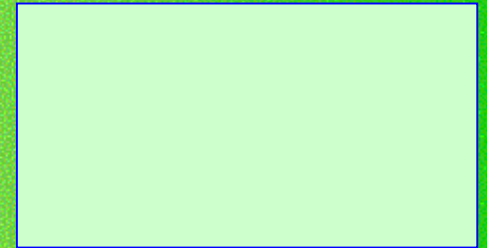
changing the type of holes



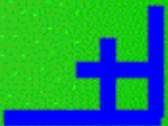
15 %



40 %



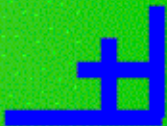
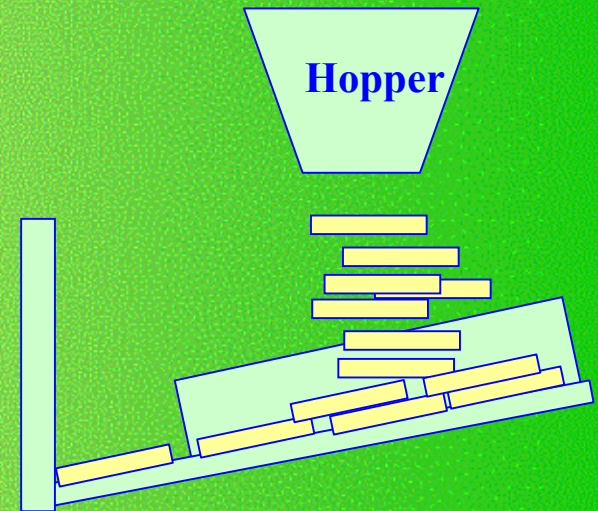
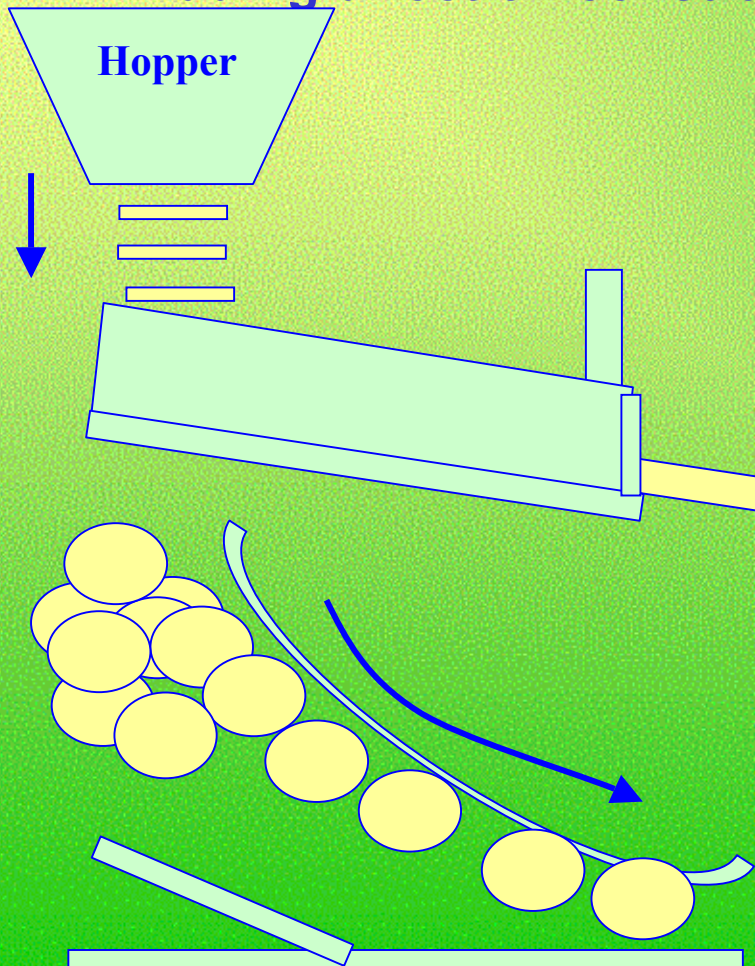
95 %





Stuck avoiding Solutions

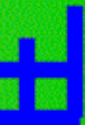
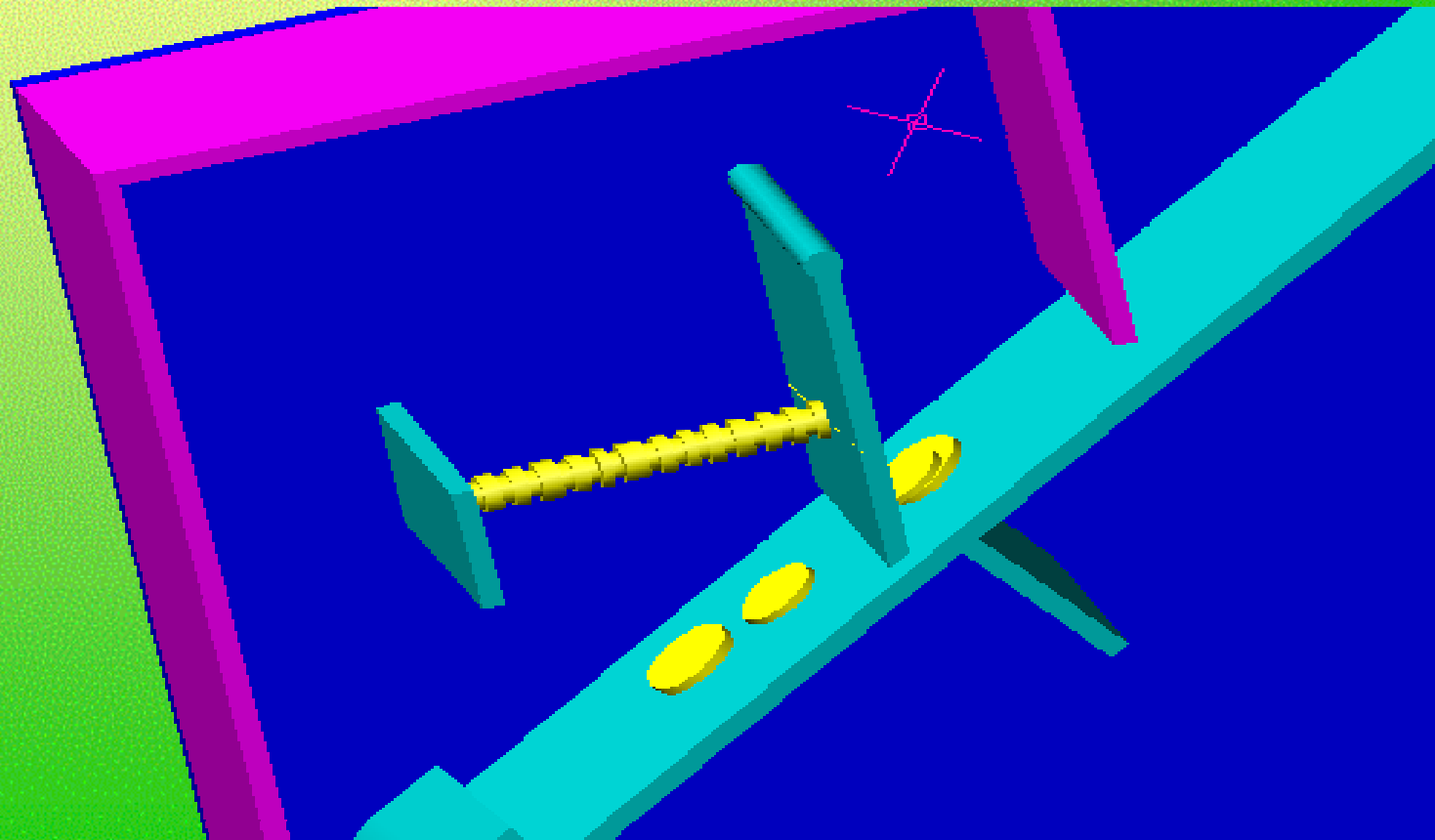
Adding direction constraint :





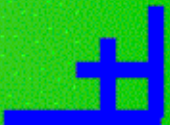
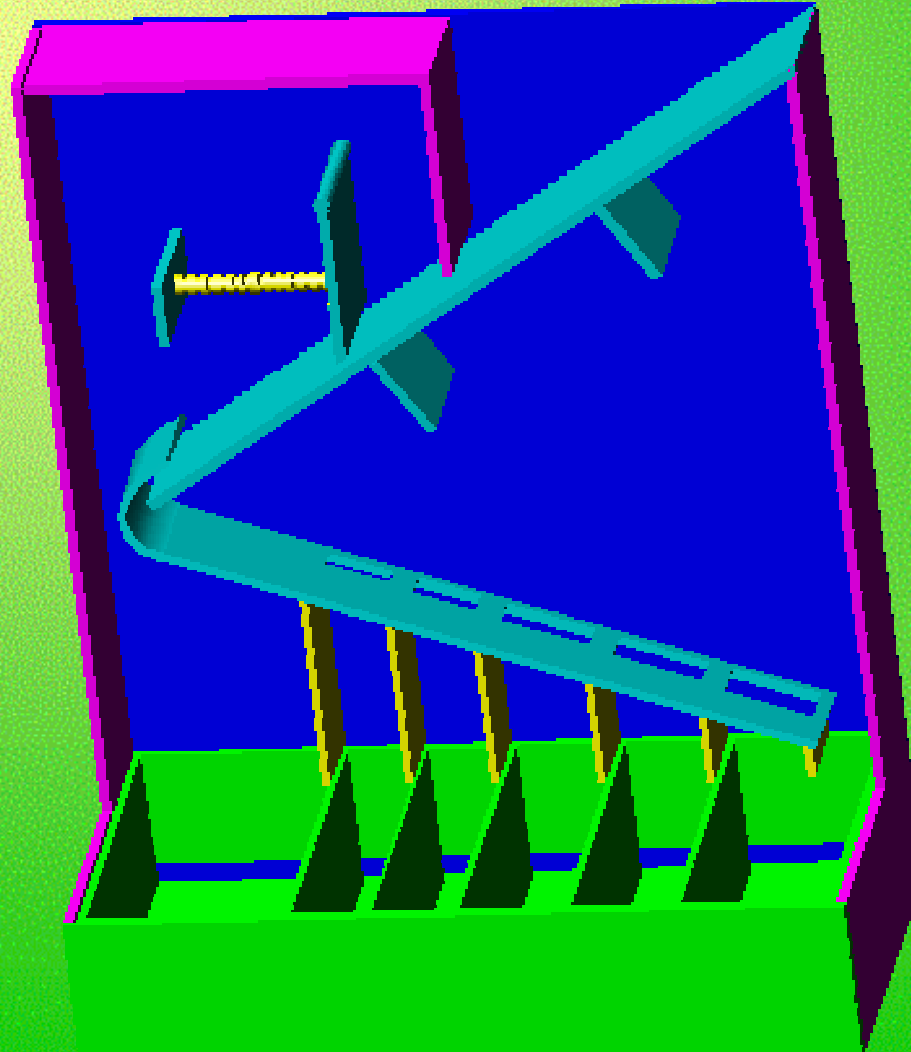
Heap up solution

changing the structure : used spring and slit door to separate coin flow





Prototype





Limitation





Welcome to Ten steps

1. Warming up
 2. Creeping drain
 3. Overcoming hurdle
 4. Crossing bridge
 5. Dog hit
 6. Flying trapeze
 7. Swatting a fly
 8. Cocking a bow
 9. Annihilating quickly
 10. Olympia top conquer
- * Happy money to you (Music)

