

<p>Calculate Theta 1</p> <p>A: Actor S: System</p>	Steps	Description
	1	A: Start program
	2	S: Ask to select an option to calculate
	3	A: Select (1) Reflection
	4	S: Ask which component of Snell's to calculate
	5	A: Select Calculate Theta1 (1)
	6	S: Ask for index 1, index 2, and angle of refraction
	7	A: Enter index 1, index 2, and angle of refraction
	8	S: Validate index 1, index 2, and angle of refraction
	9	S: Display Theta 1 Interpretation
Extensions	2a	<u>Invalid Non numerical Input</u> S: ask for a numerical input and restart to step 2
	2b	<u>Invalid numerical Input</u> S: ask for valid numerical options, restart to step 2
	2c	<u>-1 entered</u> S: exit the program with -1
	4a	<u>Invalid Non numerical Input</u> S: ask for a numerical input and restart to step 2
	4b	<u>Invalid numerical Input</u> S: display invalid choice and restart to step 2
	4c	<u>-1 entered</u> S: display invalid choice and restart to step 2
	6a	<u>Zero or negative parameter for either index 1, index 2, and angle of refraction or all</u> S: display invalid input and restart to step 2
	6b	<u>Non numerical Input</u> S: ask for a numerical input and restart to step 2

Calculate Theta 2 A: Actor S: System	Steps	Description
	1	A: Start program
	2	S: Ask to select an option to calculate
	3	A: Select (1) Reflection
	4	S: Ask which component of Snell's to calculate
	5	A: Select Calculate Theta1 (1)
	6	S: Ask for index 1, index 2, and angle of incidence
	7	A: Enter index 1, index 2, and angle of incidence
	8	S: Validate index 1, index 2, and angle of incidence
	9	S: Display Theta 2 Interpretation
Extensions	2a	<u>Invalid Non numerical Input</u> S: ask for a numerical input and restart to step 2
	2b	<u>Invalid numerical Input</u> S: ask for valid numerical options, restart to step 2
	2c	<u>-1 entered</u> S: exit the program with -1
	4a	<u>Invalid Non numerical Input</u> S: ask for a numerical input and restart to step 2
	4b	<u>Invalid numerical Input</u> S: display invalid choice and restart to step 2
	4c	<u>-1 entered</u> S: display invalid choice and restart to step 2
	6a	<u>Zero or negative parameter for either index 1, index 2, and angle of refraction or all</u> S: display invalid input and restart to step 2
	6b	<u>Non numerical Input</u> S: ask for a numerical input and restart to step 2

<p>Calculate Index 1</p> <p>A: Actor S: System</p>	Steps	Description
	1	A: Start program
	2	S: Ask to select an option to calculate
	3	A: Select (1) Reflection
	4	S: Ask which component of Snell's to calculate
	5	A: Select Calculate Theta1 (1)
	6	S: Ask for index 2, angle of refraction, and angle of incidence
	7	A: Enter index 2, angle of refraction, and angle of incidence
	8	S: Validate index 2, angle of refraction, and angle of incidence
	9	S: Display index 1 Interpretation
Extensions	2a	<u>Invalid Non numerical Input</u> S: ask for a numerical input and restart to step 2
	2b	<u>Invalid numerical Input</u> S: ask for valid numerical options, restart to step 2
	2c	<u>-1 entered</u> S: exit the program with -1
	4a	<u>Invalid Non numerical Input</u> S: ask for a numerical input and restart to step 2
	4b	<u>Invalid numerical Input</u> S: display invalid choice and restart to step 2
	4c	<u>-1 entered</u> S: display invalid choice and restart to step 2
	6a	<u>Zero or negative parameter for either index 1, index 2, and angle of refraction or all</u> S: display invalid input and restart to step 2
	6b	<u>Non numerical Input</u> S: ask for a numerical input and restart to step 2
	6c	<u>Index greater than 4</u> S: display invalid choice and restart to step 2

<p>Calculate Index 2</p> <p>A: Actor S: System</p>	Steps	Description
	1	A: Start program
	2	S: Ask to select an option to calculate
	3	A: Select (1) Reflection
	4	S: Ask which component of Snell's to calculate
	5	A: Select Calculate Theta1 (1)
	6	S: Ask for index 1, angle of refraction, and angle of incidence
	7	A: Enter index 1, angle of refraction, and angle of incidence
	8	S: Validate index 1, angle of refraction, and angle of incidence
	9	S: Display index 2 Interpretation
Extensions	2a	<u>Invalid Non numerical Input</u> S: ask for a numerical input and restart to step 2
	2b	<u>Invalid numerical Input</u> S: ask for valid numerical options, restart to step 2
	2c	<u>-1 entered</u> S: exit the program with -1
	4a	<u>Invalid Non numerical Input</u> S: ask for a numerical input and restart to step 2
	4b	<u>Invalid numerical Input</u> S: display invalid choice and restart to step 2
	4c	<u>-1 entered</u> S: display invalid choice and restart to step 2
	6a	<u>Zero or negative parameter for either index 1, index 2, and angle of refraction or all</u> S: display invalid input and restart to step 2
	6b	<u>Non numerical Input</u> S: ask for a numerical input and restart to step 2

Reflection and Refraction A: Actor S: System	Steps	Description
	1	A: Start program
	2	S: Ask to select an option to calculate
	3	A: Select (1) Reflection
	4	S: Ask which component of Snell's to calculate
	5	A: Select Calculate Theta1 (1)
	6	S: Ask for index 1, index 2, angle of refraction, and angle of incidence
	7	A: Enter index 1, index 2, angle of refraction, and angle of incidence
	8	S: Validate angle of refraction and angle of incidence and correct if necessary
	9	S: theta1, theta2, and drawing of angle
Extensions	2a	<u>Invalid Non numerical Input</u> S: ask for a numerical input and restart to step 2
	2b	<u>Invalid numerical Input</u> S: ask for valid numerical options, restart to step 2
	2c	<u>-1 entered</u> S: exit the program with -1
	4a	<u>Invalid Non numerical Input</u> S: ask for a numerical input and restart to step 2
	4b	<u>Invalid numerical Input</u> S: display invalid choice and restart to step 2
	4c	<u>-1 entered</u> S: display invalid choice and restart to step 2
	6a	<u>Zero or negative parameter for either index 1, index 2, and angle of refraction or all</u> S: display invalid input and restart to step 2
	6b	<u>Non numerical Input</u> S: ask for a numerical input and restart to step 2

Albedo A: Actor S: System	Steps	Description
	1	A: Start program
	2	S: Ask to select an option to calculate
	3	A: Select (2) Albedo
	4	S: Ask for reflected and incident solar intensity
	5	A: Enter reflected and Incident solar intensity
	6	S: Validate reflected and Incident solar intensity
	7	S: interpret albedo
Extensions	2a	<u>Invalid Non numerical Input</u> S: ask for a numerical input and restart to step 2
	2b	<u>Invalid numerical Input</u> S: ask for valid numerical options, restart to step 2
	2c	<u>-1 entered</u> S: exit the program with -1
	4a	<u>Zero or negative parameter for reflected and incident solar intensities</u> S: display invalid input and restart to step 2
	4b	<u>Non numerical Input</u> S: ask for a numerical input and restart to step 2

Intensity A: Actor S: System	Steps	Description
	1	A: Start program
	2	S: Ask to select an option to calculate
	3	A: Select (3) Intensity
	4	S: Ask what method to calculator intensity based on
	5	A: Select Calculate intensity based on energy, time, and, area((1)
	6	S: Ask for energy, time, and area
	7	A: Enter energy, time, and area
	8	S: Validate energy, time, area
	9	S: Display albedo interpretation
Extensions	2a	<u>Invalid Non numerical Input</u> S: ask for a numerical input and restart to step 2
	2b	<u>Invalid numerical Input</u> S: ask for valid numerical options, restart to step 2
	2c	<u>-1 entered</u> S: exit the program with -1
	4a	<u>Invalid Non numerical Input</u> S: ask for a numerical input and restart to step 2
	4b	<u>Invalid numerical Input</u> S: display invalid choice and restart to step 2
	4c	<u>-1 entered</u> S: display invalid choice and restart to step 2
	6a	<u>Zero or negative parameter for either area, time, energy</u> S: display invalid input and restart to step 2
	6b	<u>Non numerical Input</u> S: ask for a numerical input and restart to step 2

Intensity A: Actor S: System	Steps	Description
	1	A: Start program
	2	S: Ask to select an option to calculate
	3	A: Select (3) Intensity
	4	S: Ask what method to calculator intensity based on
	5	A: Select Calculate intensity based on power and area(2)
	6	S: Ask for power and area
	7	A: Enter power and area
	8	S: Validate power and area
	9	S: Display albedo interpretation
Extensions	2a	<u>Invalid Non numerical Input</u> S: ask for a numerical input and restart to step 2
	2b	<u>Invalid numerical Input</u> S: ask for valid numerical options, restart to step 2
	2c	<u>-1 entered</u> S: exit the program with -1
	4a	<u>Invalid Non numerical Input</u> S: ask for a numerical input and restart to step 2
	4b	<u>Invalid numerical Input</u> S: display invalid choice and restart to step 2
	4c	<u>-1 entered</u> S: display invalid choice and restart to step 2
	6a	<u>Zero or negative parameter for either power and area.</u> S: display invalid input and restart to step 2
	6b	<u>Non numerical Input</u> S: ask for a numerical input and restart to step 2