



TINA 1 PROGRAMMING COURSE STUDENT JOURNAL

REVISED MARCH 6, 2016



| NAME | |
|-----------------------|----------------|
| | |
| DATE STARTED | DATE COMPLETED |
| | |
| SCHOOL, CLASS, PERIOD | |
| | |

Copyright © 2016 NCLab Inc.

TABLE OF CONTENTS:

| LOGIN INFORMATION | 4 |
|----------------------------------|----|
| SECTION 1: BASICS | 5 |
| SECTION 2: LOOPS 1 | 12 |
| SECTION 3: LOOPS 2 | 18 |
| SECTION 4: NESTED LOOPS | 24 |
| SECTION 5: VARIABLES | 30 |
| FILE LOG: DESIGNS I HAVE CREATED | 36 |
| GRID SKETCHBOOK | 37 |
| NOTES | 38 |

General Website: <u>https://nclab.com/</u>

Turtle Gallery : <u>https://nclab.com/turtle-gallery/</u>

Desktop (needs login information) <u>https://desktop.nclab.com/</u>

LOGIN INFORMATION

Log in to account https://desktop.nclab.com/

using the name and password provided to you by your teacher.

Select "Courses" (doubleclick)





Select Tina Turtle and then Tina 1.



Select the Section (1-Basics) and Level (1.1.)

Note that only one section and level are available. The rest are locked until the section or level is successfully completed.



Keep your login name and password in a safe place.

SECTION 1: BASICS

In Section 1, learn how the coordinate plane is used in Tina, how to move and turn Tina to draw lines, how to set color, line width, and use other controls.

| | | Expart + Ven + Settings + Reset view | Start rotation |
|---|------------------------|--------------------------------------|-----------------|
| To help you remember the parts of the coord label the diagram to the right with the follow | dinate plane, ving: | | |
| Origin (0,0) | | | |
| X axis | | * | |
| Y axis | | | |
| | | | |
| | | | |
| | | | |
| | | | 11 · · 11 · · · |
| Other coordinate plane basics: | | | |
| The x axis runs | and is colored | · | |
| The y axis runs | and is colored | | |
| The z axis is perpendicular to the x and y a | axis and is colored | It is not visible in 2 dim | ensions. |
| | | | |
| One grid space equals units. | | | |
| Tina's default position is () and she fa | aces Her def | ault color is | |

Write the following commands. Don't forget details like parentheses.

| Move Tina forward | |
|-------------------|--|
| | |
| Turn Tina left | |
| | |
| | |
| | |
| Turn Tina right | |
| 6 | |
| | |
| | |

COLOR:

The color command for Tina is written: _____

Tina has many defined colors, including names like STRAWBERRY and STEEL. A valid defined color will look like

Experiment with different names. List and describe some defined colors that you have discovered and may want to use..

| COLOR NAME | Description | Sample |
|------------|-------------|--------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Describe the function of the following commands. Add any details that may be useful.

| tina.up() | |
|-----------------|--|
| | |
| | |
| tina.down() | |
| | |
| | |
| tina.hide() | |
| | |
| | |
| tina.back(d) | |
| | |
| | |
| tina.extrude(n) | |
| | |
| | |
| tina.goto(x,y) | |
| | |
| | |

When should the goto command be used? Why should it be used only when necessary?

List the steps needed to save and publish a design.

About tangrams (Section 1.8: Art Project)

The tangram consists of seven pieces as described below:

Choosing a unit of measurement so that the seven pieces can be assembled to form a square of side one unit and having area one square unit, the seven pieces are:

- 2 large right triangles (hypotenuse 1, sides $\sqrt{2}/2$, area 1/4)
- 1 medium right triangle (hypotenuse $\sqrt{2}/2$, sides 1/2, area 1/8)
- 2 small right triangles (hypotenuse 1/2, sides $\sqrt{2}/4$, area 1/16)
- 1 square (sides $\sqrt{2}/4$, area 1/8)
- 1 parallelogram (sides of 1/2 and $\sqrt{2}/4$, area 1/8)

Try setting the hypotenuse of large triangle as 40 units.



SECTION 1: TANGRAM ART PROJECT

DESIGNING THE ART PROJECT

Draw the design.

Describe the shapes. What commands will you need to draw them? Name each shape (for example Purple Triangle 1) and describe the color, starting position, line lengths, turning angles, and coordinates for the goto command if needed.

Write out the order in which you will program the shapes. Where do the shapes attach to each other? When will the up, down, and back commands be useful?



REFLECTION ON TANGRAM ART PROJECT

When you made your final design, did you use goto()? Why did you decide to use it instead of a combination of go(), left() and right()?

How do you decide what angle to use with the left() or right() commands?

How many lines of programming did your project need to create the shapes?

What would you like to create with Tina?

Art Project File Name: ______

File is located at ______

Screen Shot of Art Project



NOTES ON SECTION 1: BASICS



SECTION 2: LOOPS 1

In Section 2, learn how to use For loops to repeat a set of commands.

In the following example, explain what each line is telling the computer to do:

| The command line | means |
|------------------------------------|----------------------|
| For i in range(4): | |
| tina.go(50) | |
| tina.left(90) | |
| What will the drawing look like? | |
| What would you change to make an e | quilateral triangle? |

What two commands are used for all of the figures in Section 2?

How do you decide what angle to turn?

What happens if you change the number of times i is repeated (the range)?

What happens if you change the angle slightly?

| Number of sides (n) | Turn angle (360/n) | Resulting Polygon |
|---------------------|--------------------|-------------------|
| | | Triangle |
| | 90 | |
| 5 | | |
| | 60 | Hexagon |
| 8 | | |
| | 30 | |
| | | "Circle" |

Create an input/output table of values used to create polygons.

How does the star polygon relate to a regular pentagon?

Did you experiment with any other repeated patterns? What did you learn?

SECTION 2: PENDANT

DESIGNING THE ART PROJECT

Draw the design.

Describe the shapes. What commands will you need to draw them? Name each shape (for example Gold Star) 1) and describe the color, starting position, line lengths, turning angles, and coordinates for the goto command if needed.

Write out the order in which you will program the shapes. Where do the shapes attach to each other? When will the up, down, and back commands be useful?



REFLECTION ON PENDANT ART PROJECT

How did you use the For loops in your design?

If you were able to print the design, how did it turn out? Would you make changes to your design next time (for example, in the extrude thickness?

Which parts of the design process were difficult? Which parts were easy?

What would you like to design next?

Art Project File Name: _____

File is located at ______

Screen Shot of Art Project



NOTES ON SECTION 2: LOOPS 1



In Section 3, learn how to write loops to create more complex linear and rotated patterns.

Vocabulary Review: Match the term with the correct definition.

| Algorithm | Α. | an algorithm written using a programming language |
|------------------|----|--|
| Logical Error | В. | the way a command line is written |
| Computer Program | C. | a series of logical steps that leads to the solution of a task |
| Syntax | D. | a mistake in an algorithm |
| Syntax Error | E. | a mistake in spelling, operators, indentations, spaces |

Use the following questions to reflect on your progress as a computer programmer.

Level 3.2 There are a number of ways to turn Tina as she is drawing the sawtooth. Compare your solution with other students. Did they end up with Tina in the same orientation? Which solution is the most elegant (simple, effective and easy to understand)?

Level 3.3 Why do you think you start with Tina going 20 steps before beginning the loop?

Level 3.4 It is easy to make mistakes in this program. If you make a mistake, what did you learn from it? What pattern resulted from the mistake?

Level 3.6 Describe your program in words. Imagine that you are teaching a new student how to write a program. Can you explain how you go about planning and writing code?

Level 3.7 Why do you use the goto command in this level?

End of Section 3 What are some benefits of writing loops?

SECTION 3: REPEATED PATTERNS

DESIGNING THE ART PROJECT

Draw the design.

Describe the design. What commands will you need to draw the patterns? Describe the colors, starting positions, line lengths, turning angles, and coordinates for the goto command if needed.

Write out the order in which you will program the components. When will the up, down, and back commands be useful?



REFLECTION ON REPEATED PATTERNS ART PROJECT

How did you use the For loops in your design?

If you were able to print the design, how did it turn out? Would you make changes to your design next time (for example, in the extrude thickness?

Which parts of the design process were difficult? Which parts were easy?

What would you like to design next?

Art Project File Name: _____

File is located at ______

Screen Shot of Art Project



NOTES ON SECTION 3: LOOPS 2



SECTION 4: NESTED LOOPS

In Section 4, learn how to write nested loops (loops within loops).

Designers often collect patterns as a reference library.

Collect photographs or drawings of patterns within patterns, for example: lace, chains, tessellations, fabric and knits, beadwork, shells, gears. Paste them in these boxes.



Level 4.6 Math Challenge: In Level 4.6, the angles used in the design are 90, 165 and 75 degrees. How are the angles 165 and 75 derived?

Reflection: What is the main difference between the code for the mosaic and code for the gear?

SECTION 4: NESTED LOOP ART PROJECT

DESIGNING THE ART PROJECT

Draw the design.

Describe the patterns and shapes. What commands will you need to draw them? How will you name the loops in your comment lines? Describe the colors, starting positions, line lengths, turning angles, and coordinates for the goto command if needed.

Write out the order in which you will program the loops. Try writing or diagramming the loops as a flow chart.



REFLECTION ON NESTED LOOP ART PROJECT

How did you use the nested loops in your design?

If you were able to print the design, how did it turn out? Would you make changes to your design next time?

Which parts of the design process were difficult? Which parts were easy?

What would you like to design next?

Art Project File Name: _____

File is located at ______

Screen Shot of Art Project



NOTES ON SECTION 4: NESTED LOOPS

Learn to use variables in the For loop.

Instead of i being defined as one value, a fixed number of equal steps, i can now represent a range of values. These values can change the outcome of each repetition of the loop. Any operation (addition, subtraction, multiplication, division) can be used to include i in the commands, creating interesting linear and non-linear designs.

Use the word list to complete these definitions of variable and range.

| variable | counting | upper | output | difference | body | value | | | | |
|--|---|---------------|---------------------|------------------------|-----------------|--------------|--|--|--|--|
| memory | For loop | lower | 0 | 10 | | | | | | |
| Variable: | in terms of prog | ramming, | is the | is the name and of som | | | | | | |
| will be recorded in In the, the i is an index or | | | | | | | | | | |
| variable. If we set i to a range of values, then i will change each time the loop starts the | | | | | | | | | | |
| of the program. If we then use i as part of a command, that command will a different | | | | | | | | | | |
| value each time. | | | | | | | | | | |
| | | | | | | | | | | |
| Range: the | e range is the lov | ver and upper | limit of the varial | ole i. Note that if | the range is se | et with only | | | | |
| one value, | then the | limit o | f the range is ass | umed to be | , wit | h the | | | | |
| number in | number in the parentheses being the limit. Important: the final value will be the | | | | | | | | | |
| | between the upper and lower limit. For example, in range (1,11), the final value | | | | | | | | | |
| used in the | used in the program is, or 11-1. | | | | | | | | | |
| | | | | | | | | | | |

New Command angle()

Definition:

You may find the math challenging in this section.

Write down your successes, challenges and questions for each level.

| Successes | Challenges | Questions |
|-----------|------------|-----------|
| Level 5.1 | | |
| Level 5.2 | | |
| Level 5.3 | | |
| Level 5.4 | | |
| Level 5.5 | | |

SECTION 5: DESIGN WITH VARIABLES ART PROJECT

DESIGNING THE ART PROJECT

Draw the design.

Describe the patterns and shapes. How do they change? What commands will you need to draw them? How will you name the loops in your comment lines? Describe the colors, starting positions, line lengths, turning angles, and coordinates for the goto command if needed. Will you need the angle() command?

Write out the program steps. Try writing or diagramming the loops as a flow chart. How many times will you repeat the loop? Are you decreasing or increasing the count?



REFLECTION ON NESTED LOOP ART PROJECT

How did you use variables in your design?

If you were able to print the design, how did it turn out? Would you make changes to your design next time?

Which parts of the design process were difficult? Which parts were easy?

What would you like to design next?

Art Project File Name: ______

File is located at ______

Screen Shot of Art Project



NOTES ON SECTION 5: VARIABLES

DESIGNER LOG - DESIGNS I HAVE CREATED

| File Name | Date created | Description |
|-----------|--------------|-------------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

The following grid page can be used for your designs. Make a clear plastic overlay to use on the grid, or make copies for sketching and designing when you don't have a computer handy.

NOTES