

Students:
Section 1.1 is a part of 1 assignment: **CSC108 CH01 PA**
☒ This assignment's due date has passed. Activity will still be recorded, but will not count towards this assignment (unless the due date is changed). See [this article](#) for more info.

Includes: PA
Due: 01/30/2025, 11:59 PM EST

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1.1 Programming (general)

Computer program basics

Computer programs are abundant in many people's lives today, carrying out applications on smartphones, tablets, and laptops, powering businesses like Amazon and Netflix, helping cars drive and planes fly, and much more.

A computer **program** consists of instructions executing one at a time. Basic instruction types are:

- **Input**: A program gets data, perhaps from a file, keyboard, touchscreen, network, etc.
- **Process**: A program performs computations on that data, such as adding two values like $x + y$.
- **Output**: A program puts that data somewhere, such as to a file, screen, network, etc.

Programs use **variables** to refer to data, like x , y , and z below. The name is due to a variable's value varying as a program assigns a variable like x with new values.

PARTICIPATION ACTIVITY | 1.1.1: A basic computer program.

Start 2x speed

Computer program

```
x = Get next input  
y = Get next input  
z = x + y  
Put z to output
```

x: 2
y: 5
z: 7

Input (keyboard) 2 5

Output (screen) 7

Captions ^

1. A basic computer program's instructions get input, process, and put output. This program first assigns x with what is typed on the keyboard input, in this case 2.
2. The program's next instruction gets the next input, in this case 5.
3. The program then does some processing, in this case assigning z with $x + y$ (so $2 + 5$ yields z of 7).
4. Finally, the program puts z (7) to output, in this case to a screen.

[Feedback?](#)

PARTICIPATION ACTIVITY | 1.1.2: A basic computer program.

Consider the example above.

1) The program has a total number of _____ instructions.

Check [Show answer](#)

2) Suppose a new instruction was inserted as follows:

...
 $Z = x + y$
Add 1 to z (new instruction)
Put z to output

What would the last instruction output to the screen?

Check [Show answer](#)

3) Consider the instruction: $z = x + y$. If x is 10 and y is 20, then z is assigned with _____.

Check [Show answer](#)

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A program is like a recipe

Some people think of a program as being like a cooking recipe. A recipe consists of *instructions* that a chef executes, like adding eggs or stirring ingredients. Likewise, a computer program consists of instructions that a computer executes, like multiplying numbers or putting out a number to a screen.

Baking chocolate chip cookies from a recipe

1. Mix one stick of butter and one cup of sugar.
2. Add egg and mix until combined.
3. Stir in flour and chocolate.
4. Bake at 350°F for 8 minutes.

PARTICIPATION ACTIVITY | 1.1.3: A first programming activity.

Execute the program by clicking the "Run program" button and observe the output. Click and drag the instructions to change the order of the instructions, and execute the program again. Not required, but can you make the program output a value greater than 500? How about greater than 1,000?

Run program

```
m = 5  
put m  
[m = m * 2]  
[put m]  
[m = m * m]  
[put m]  
[m = m + 15]  
[put m]
```



[Feedback?](#)

PARTICIPATION ACTIVITY | 1.1.4: Instructions.

- 1) Which instruction completes the program to compute a triangle's area? The equation for a triangle's area is $1/2 * base * height$.
- base = Get next input
height = Get next input
Assign x with $base * height$

Put x to output

- Multiply x by 2
- Add 2 to x
- Multiply x by $1/2$

- 2) Which instruction completes the program to compute the average of three numbers?

x = Get next input
 y = Get next input
 z = Get next input

Put a to output

- $a = (x + y + z) / 3$
- $a = (x + y + z) / 2$
- $a = x + y + z$

[Feedback?](#)

Computational thinking

Mathematical thinking became increasingly important throughout the industrial age to enable people to successfully live and work. In the information age, many people believe **computational thinking**, or creating a sequence of instructions to solve a problem, will become increasingly important for work and everyday life. A sequence of instructions that solves a problem is called an **algorithm**.

PARTICIPATION ACTIVITY | 1.1.5: Computational thinking: Creating algorithms to draw shapes using turtle graphics.

A common way to become familiar with algorithms is called turtle graphics: You instruct a robotic turtle to walk a certain path, via instructions like "Turn left", "Walk forward 10 steps", or "Pen down" (to draw a line while walking).

The 6-instruction algorithm shown below ("Pen down", "Forward 100", etc.) draws a triangle.

1. Press "Run" to see the instructions execute from top to bottom, yielding a triangle.
2. Can you modify the instructions to draw a square? Hint: "Pen down", "Forward 100", "Left 90", "Forward 100", "Left 90"—keep going!
3. Experiment to see what else you can draw.

Note: The values after a Left or Right turn are angles in degrees.

How to:

- Add an instruction: Click an orange button ("Pen up", "Pen down", "Forward", "Turn left").
- Delete an instruction: Click its 'X'.
- Move an instruction: Drag it up or down.

Pen up Pen down Forward Turn left

Clear

Pen down X

Run

Forward 100 X

Left 120 X

Forward 100 X

Left 120 X

Forward 100 X

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How was this section? 1 2 [Provide section feedback](#)

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Completion details

↓1.2 Programming basics