

comp

110

live

Introduction to Programming & Data Science


Course Objectives

- You will learn the **fundamentals of programming** in the application area of **data science**
 - These concepts are universal and apply to nearly all programming languages
 - You will leave knowing what it feels like to be a programmer
 - You will know how to write programs to analyze and visualize real-world data sets
- You will gain practice with **computational thinking**
 - **Thinking algorithmically** while breaking down problems step-by-step
 - Thinking at varying levels of **abstraction** by describing problems & solutions abstractly and precisely
- You will understand what the fields of **computer science** and **data science** are about

PollEverywhere for UNC Students

- Earlier today instructions for accessing PollEv were posted to Sakai
- You should register and login via poll.unc.edu
- Respond via the PollEv.com URL posted in Sakai
 - Bookmark this URL!
- There is currently an open survey to respond to!

Meet the Real MVPs

- Your COMP110 UTA Team
- This course would be **impossible** for all of us, if not for them.
- THE absolute best UTA team at Carolina. You will  them.
- This team can do it all: they'll help teach you concepts you're struggling with, guide review sessions, study guides, generate lecture ideas, and build problem sets. The 110 secret sauce.
- You will be assigned 2x UTAs who are your personal leads. Additionally, drop-in, zoom office hours will be available to you for over 40 hours a week.

Your COMP110 Teaching Team

Lizzie Abouchar

Chiazo Agina

Maya Agnihotri

Madyson Barber

Helen Charbonnet

Yang Chen

Jasper Christie

Lucy Conway

Clayton Covington

Manuela Danso-Fordjour

Shaurik Deshpande

Fernando Garcia

Isabella Ford

Aneka Happer

Claire Helms

Victoria Hoffmann

Moshe Ikechukwu

Kris Jordan

Elisa Kadackal

Jenne Kang

Margaret Lake

Marc Lewis

Langston Luck

Harman Martin

Alfred Mathew

Janet Mbugua

Makenzie O'Brien

Garrison Parish

Kush Patel

Chelsea Rowe

Kaki Ryan

Rebekah Seawell

Naomi Smith

Kyle Sorensen

Raven Taylor

Hanna Tischer

Cindy Wang

Marlee Walls

Lilly Whalen

Ezri White

Anna Xu

Megan Zhang

Andrew Zheng

Zero Programming Experience Expected

- This course assumes *no* prior programming experience
 - But some experience is OK
- COMP110 is a *rigorous* introduction to programming.

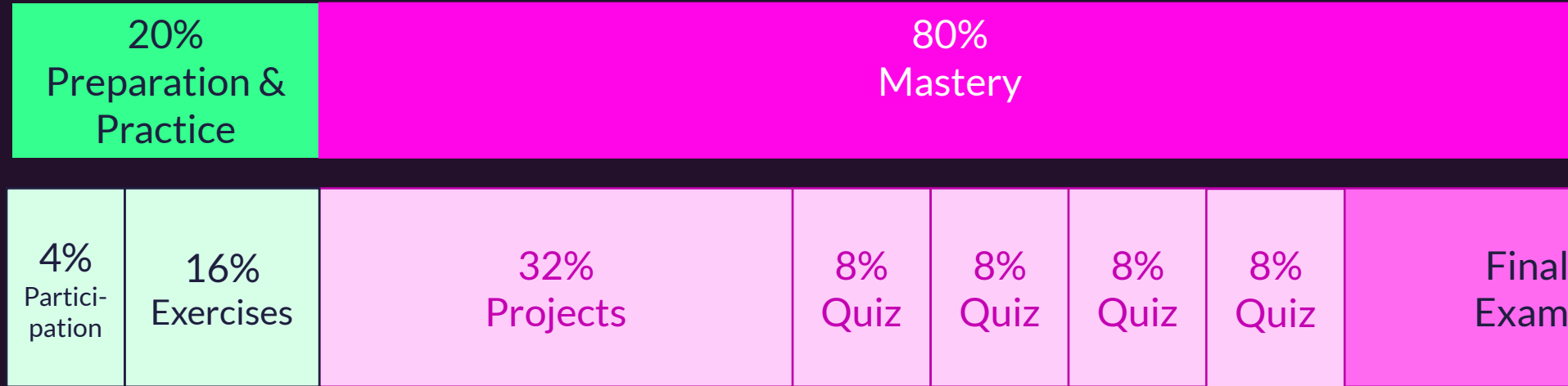
The **Instructional Format** of COMP110

- Will components of COMP110 be taught **synchronously**? Yes!
 - Synchronous components will be focused on practice.
 - Plan to meet in smaller zooms starting next week for groupwork. Instructions to follow.
- Will components of COMP110 be taught **asynchronously**? Yes!
 - Lessons teaching new concepts, tutorials guiding through construction, and such.
 - The general aim is for ~2.5-3 hours of instruction per week and 7-9hrs practice.
- What if, for you, it's just after **5 AM** right now?
 - A survey will go out later this week and for students enrolled internationally we will have an alternative form of participation from 4:45am - 6am EST available.

What will you *do* in COMP110?

- **Prepare** - Actively Watch Assigned Videos and Review Notes
 - Like assigned readings in other courses except mostly video
 - You should take notes and engage as if it were lecture..
..you can use **1 page of handwritten notes on warm-up questions**
- **Participate** - Synchronous Gatherings
 - Warm-up questions based on earlier concepts
 - Practice reading, diagramming, and writing code
 - Ungraded, challenge problems to dig into important concepts
- **Practice**
 - Environment Diagrams: Pen-and-paper evaluation of code just like the computer does
 - Programming Exercises: Small programming problems to practice fundamentals
- **Demonstrate Mastery**
 - Projects: 5x open-ended programming projects
 - Quizzes: 4x timed quizzes that involve environment diagrams and programming exercises just like the *Practice* component
 - Final Exam: TBD

Grading Breakdown



Final Exam

Weight is 16% if you take 4 quizzes.

Weight is 24% if you are absent for a quiz.

To pass COMP110 you must have a passing grade overall, take 3 of 4 quizzes, and earn higher than a 40% on the final exam.



Taking 3 of 4 quizzes is required.

You may request absence, with notice, for one quiz.

The absence request form is on the syllabus.

Format of quizzes and final will be announced before they begin.

Collaboration Policy & Honor Code

We take honor code violations very seriously.
Understand the policy details on the syllabus.

Collaboration Policy – General Content

- You are encouraged to discuss *general course concepts* with anyone including students not in 110 and tutors.
- This includes reviewing:
 - Slides
 - Documentation
 - Example lecture code
 - Exam study guides

Collaboration Policy – Graded Assignments

- No collaboration with anyone in or out of the course is allowed on exercises, projects, quizzes, or exams.
- **The only permitted collaborators on exercises and projects are UTAs while they are working in their official capacity as a UTA.**
- What is collaboration?
 - Looking at/sharing, or letting someone else look at/share, your screen.
 - Talking about your code in a step-by-step fashion
 - Copying or sharing code with anyone else or from community websites like StackOverflow, Chegg, GitHub, or CourseHero
 - Asking for help from peers on GroupMe or any other group chat

PollEverywhere Questions and Answers

- Logged into PollEv with your UNC account, you can ask questions
- Questions are moderated by your amazing Grad TA Kaki Ryan
 - Primarily looking for questions that will be applicable to most of your peers
- At various checkpoints through class I'll go through questions
- For questions we cannot get to, please come ask us in office hours!
 - Especially for any questions based on content we have not yet covered!

Programming is a Practiced Skill

- Like playing an instrument, painting, writing cursive letters, dancing, singing, sports, wood working, quilting, and so on....

Time spent individually practicing is the key to success.

- This is *very different* from courses that are knowledge-based!
- The team and I want you to succeed in learning how to program, so we structure everything we do toward helping you practice individually.

Not all the time you spend is equally valuable to you...

Goal: Learn how to paint on your own.

Per unit time spent on these activities, which are most valuable to your growth?

1. Sitting in front of a canvas and painting yourself
2. Going to a painting class or watching Bob Ross and reproducing his work
3. Having a one-on-one instructor talk you through nearly every stroke you make
4. Attempting to copying every stroke a friend makes
5. Watching Bob Ross while not painting alongside him

How do *you* believe programming will be valuable toward achieving *your* personal goals?

Reflect on this question for a couple minutes and write down your thoughts.

Then, respond on PollEv.com with a sentence or two that captures

Computer Scientists
are

Toolsmiths



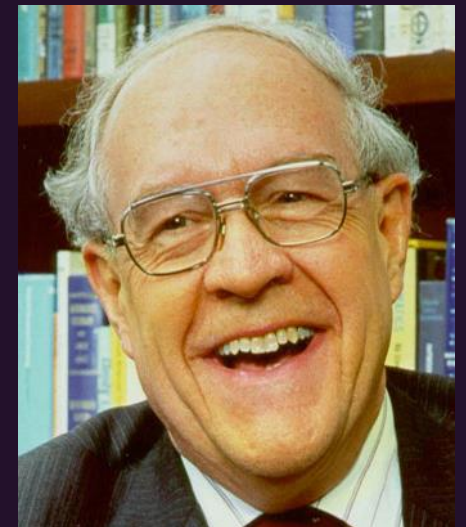
“The *programmer*, like the poet, works only slightly removed from *pure thought-stuff*.

(S)he builds castles in the air, from air, *creating by exertion of the imagination*.

Few media of creation are
so *flexible*
so *easy to polish* and **rework**
so *readily capable* [...]”

Fred Brooks

Baller / O.G. / Founder of UNC CS Department



“Think...

Type...

“Magic Happens.”

Prof. Gary Bishop

"To me, *programming*
is more than an important
practical art.

It is also a
gigantic undertaking
in the
foundations of knowledge."



Dr. Grace Hopper

"**Humans** are **allergic to change.**

They love to say,
'We've always done it this way.'

I try to fight that.

That's why I have a clock on my wall
that ***runs counter-clockwise.***"

"If you've got a **good idea**,
and it's a **contribution**,
I want you to go ahead and **DO IT.**
It is **much easier to apologize**
than it is to get permission."

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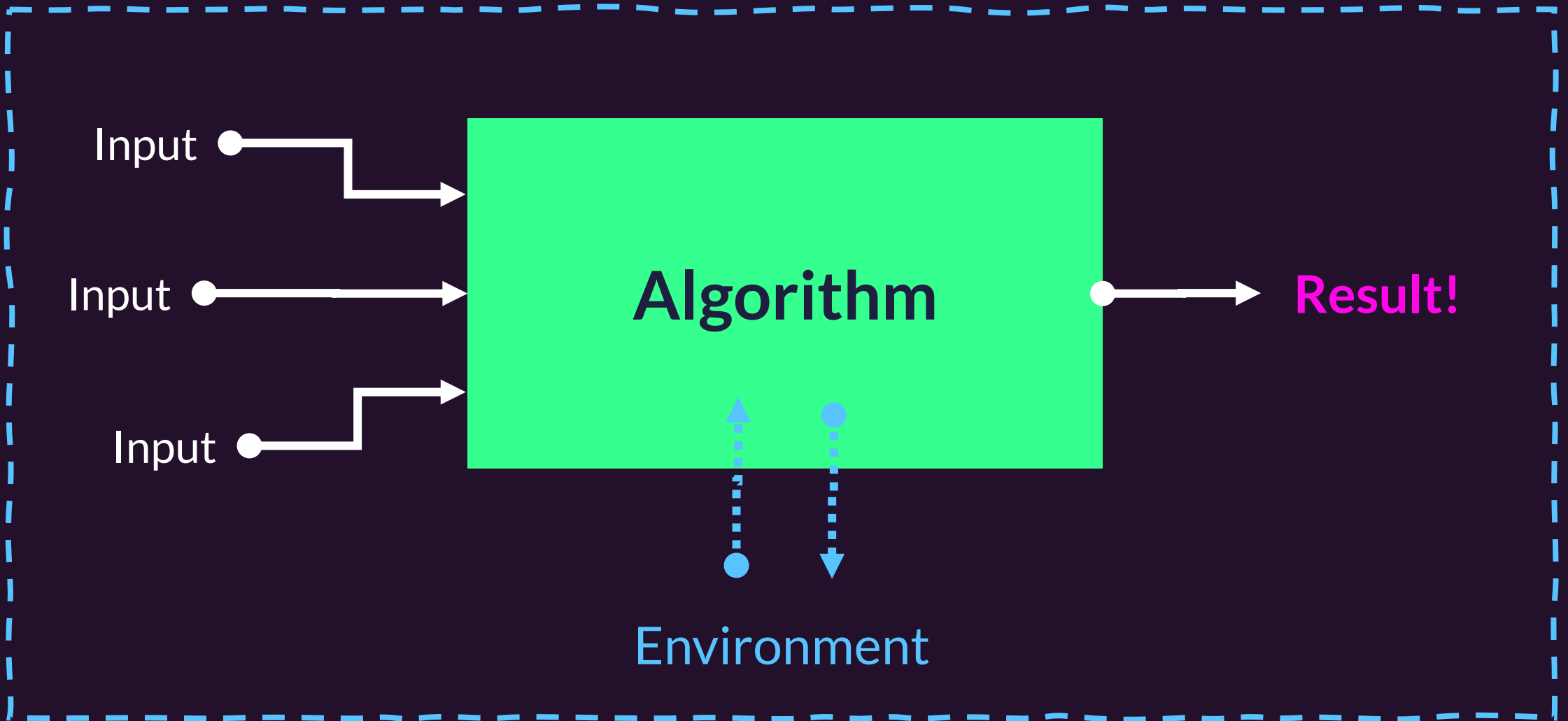
Public Access

How do *you* believe programming will be valuable toward achieving *your* personal goals?

& now for some...

Computer Science !

The Fundamental Pattern



The Fundamental Pattern

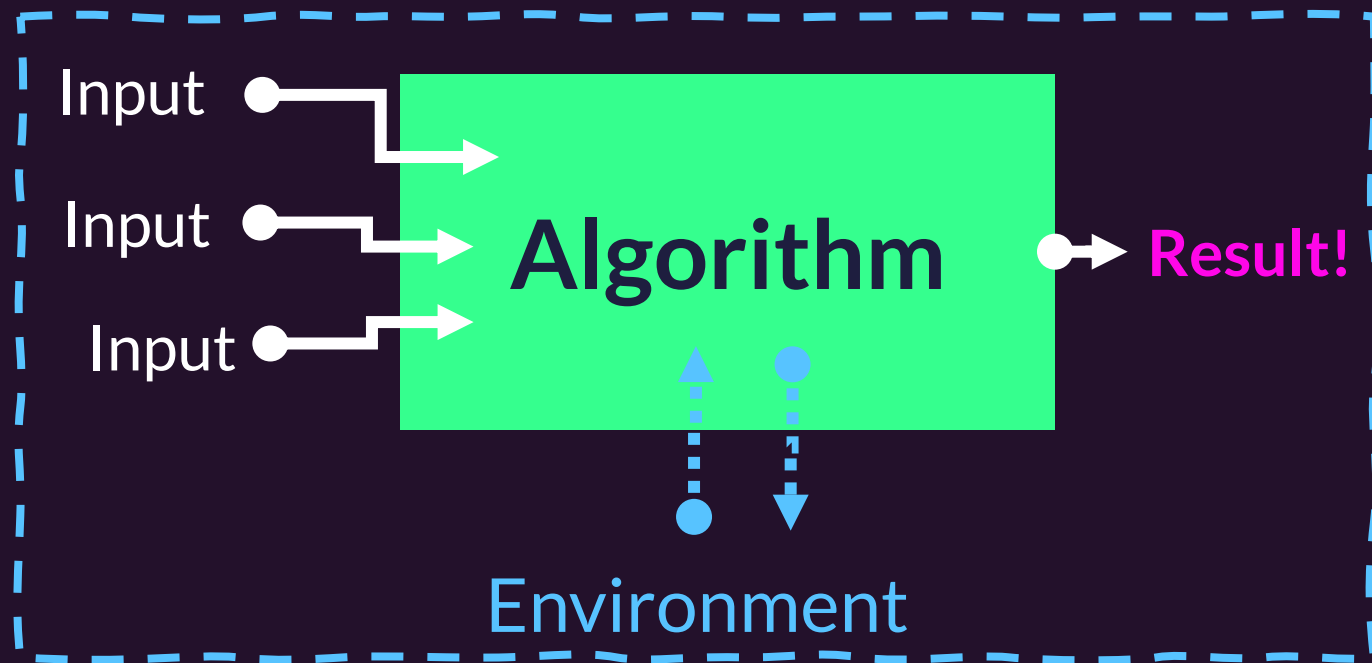
From the scale of **single lines of code** to **complete programs**, this pattern of thinking is pervasive

Input is data given to an algorithm

An **algorithm** is a series of steps

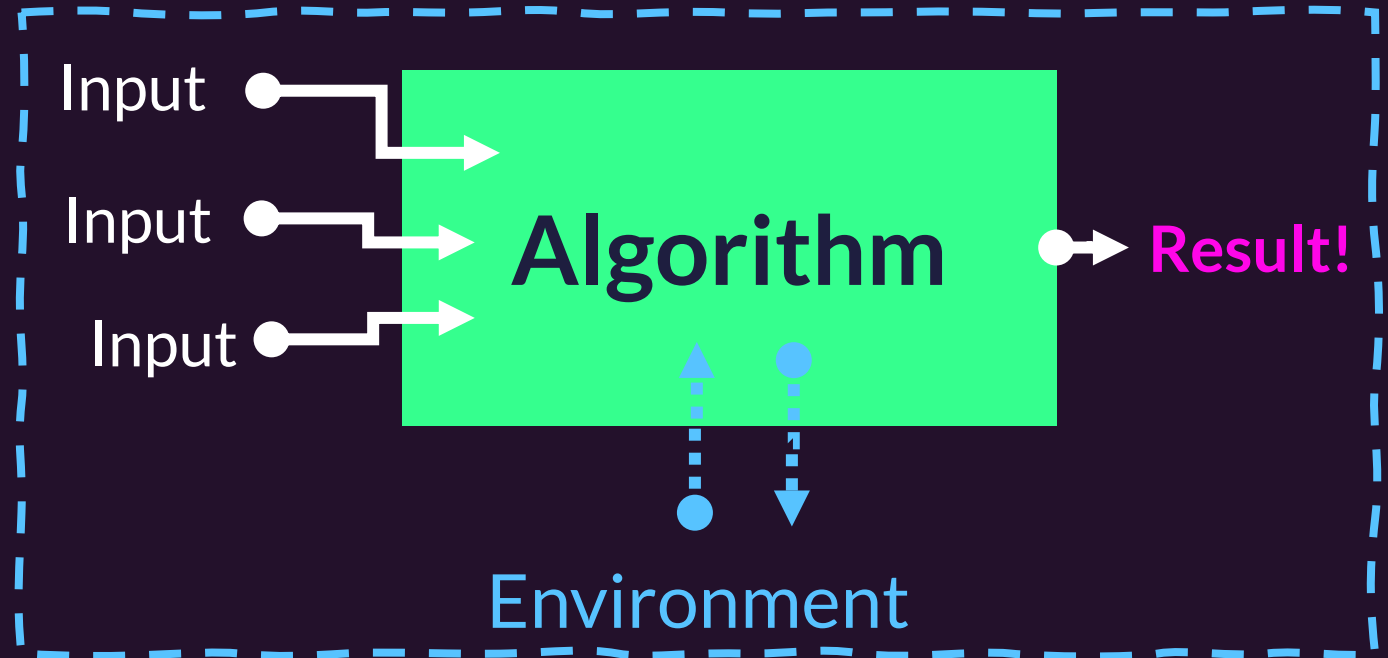
An algorithm **returns** some **result**

An algorithm *may* be influenced by its **environment** and it *may* produce side-effects which influence its environment.



Critical thinking...

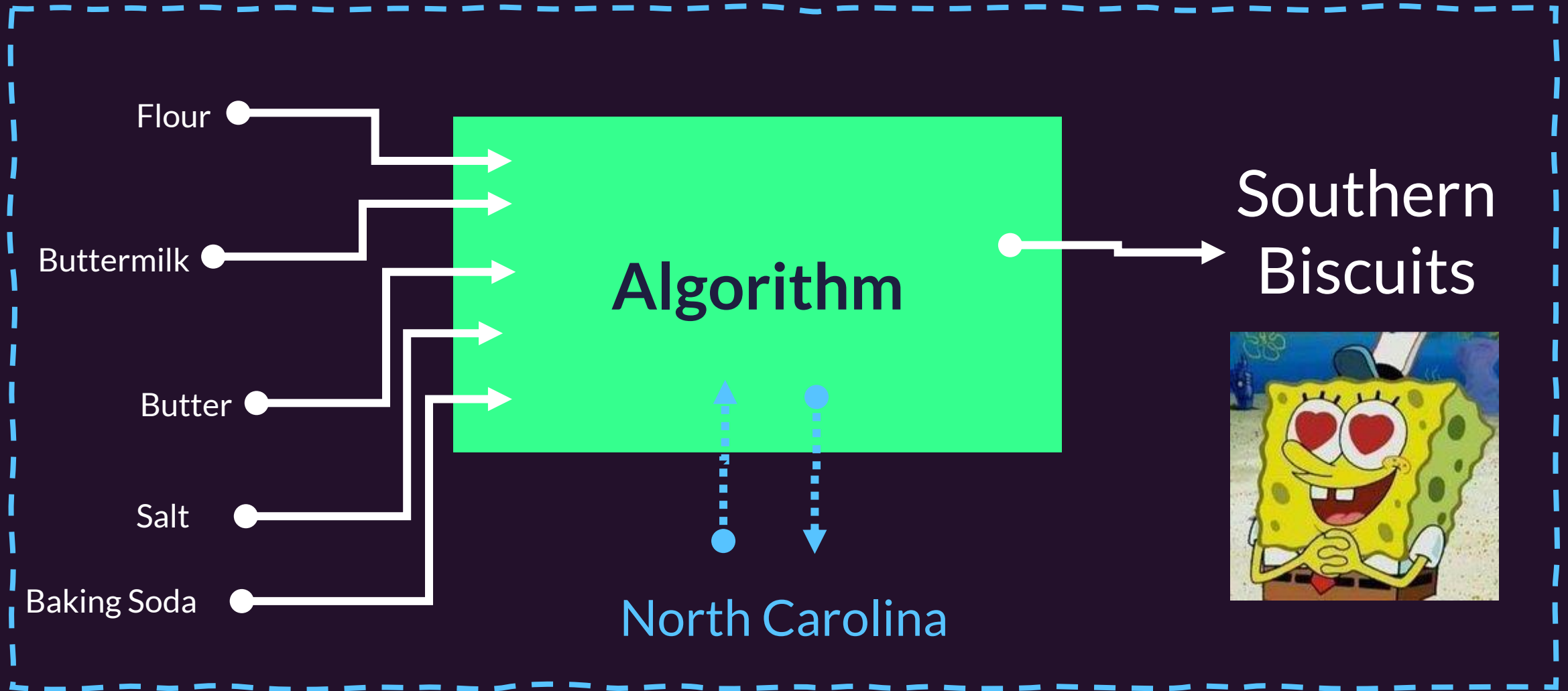
- Think about where this pattern exists in a field you're interested in?
- What are the inputs?
- What is the algorithm?
- What is the intended result?
- Do conditions of an "environment" influence the algorithm?
- Does the algorithm produce any side-effects on the "environment"?



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The Fundamental Pattern



The Journey Ahead

Course Web Page: 20f.comp110.com

- Course Itinerary
 - Lessons & Slides
 - Videos
 - Exercises
- Resources
- Sakai for e-mail announcements and other private information

Homework - Tonight

- Register for PollEverywhere through UNC
- **Update your computer's operating system!**
 - Instructions are posted under the Resources section.
- The first exercise will be released by tomorrow evening.
 - Installing required tools on your ~~freshly updated~~ computational machine
 - Setup your course workspace for the semester ahead
 - Write your first program and submit it for credit!

Office Hours for Help Getting Started

- See Sakai's Resources Page > Office Hours / Course Care
 - Instructions on how to register.
- **Tonight from 7pm to 9pm**
- **Wednesday from 10am - 12pm and 2pm - 8pm**
- **Thursday from 10am - 4:45pm and 7pm - 9pm**
- **Get help installing course software!**
 - Or just come introduce yourself and meet some great people on the team!

We'd love **feedback** throughout the semester.

- We welcome feedback on all aspects of the course
 - From as simple as “your mic was too quiet”
 - To suggestions on how to improve the stream, etc.
- Feedback form is linked in the footer of the course site
- **Please give us feedback while we have time to act on it!**
- I'll also take class wide feedback through the semester.

Connecting on Social Media

- YouTube: You're on it! *Subscribe!*
- Twitter: @KrisJordan
- Insta: @therealkrisjordan
- Finsta: @ada_dog_omg

