

# The Process of Student Code Writing Matters!

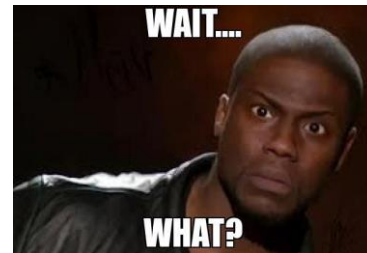
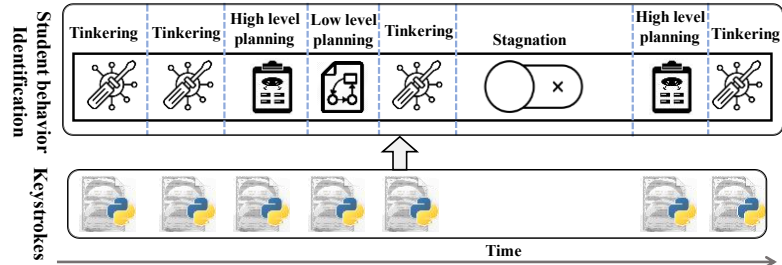


#2321304 Learning Analytics for Process-driven Computer Programming Assignments

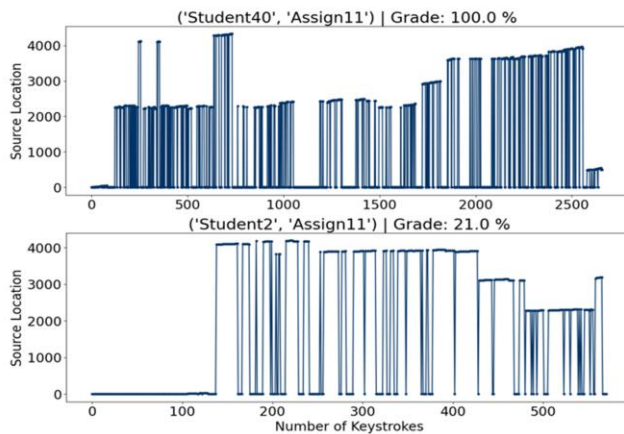
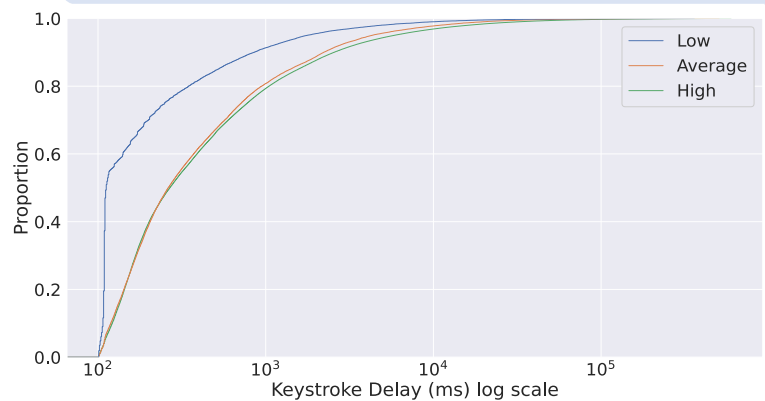
## The tale of two submissions

['Student40', 'Assign11']   Grade: 100%	['Student2', 'Assign11']   Grade: 21%
<pre> 1 from modules.orbian import Orbian 2 from time import sleep 3 from random import randint 4 from random import shuffle 5 def main(): 6     print("WELCOME TO ORBIAN FAMILY") 7     print() 8     family = [] 9     input("Enter to Create the First Four Orbians ") 10    for i in range(0, 4): 11        name = input("\nEnter a name for Orbian " 12                    + str(i + 1) + ": ") 13        headRadius = randint(2, 5) 14        bodyRadius = randint(3, 9) 15        bodyHeight = randint(5, 15) 16        family.append(Orbian(name, headRadius, 17                            bodyRadius, bodyHeight)) 18    print("\nCreating your Orbian Family", end="") 19    thinking() 20    done = False 21    while not done: 22        print() 23        print("Menu") 24        print("\t1) Meet Orbian Family") 25        print("\t2) Compare Orbians") 26        print("\t3) Orbian Info") 27        print("\t4) Create Orbian Baby") 28        print("\t5) Send to Pasture") 29        print("\t6) Orbian Thanos") 30        print("\t7) Quit") 31        choice = int(input("Choose an option: ")) 32        print() 33        if choice == 1: 34            listFamily(family) 35        elif choice == 2: 36            compare(family) 37        elif choice == 3: 38            info(family) 39        elif choice == 4: 40            createBaby(family) 41        elif choice == 5: 42            toPasture(family) 43        elif choice == 6: 44            thanosSnap(family) 45        elif choice == 7: 46            done = True 47    print("Thanks for playing Orbian Family!!!") </pre>	<pre> 1 from modules.orbian import Orbian 2 from time import sleep 3 from random import randint 4 from random import shuffle 5 def main(): 6     print("WELCOME TO ORBIAN FAMILY") 7     print() 8     family = [] 9     input("Enter to Create the First Four Orbians ") 10    for i in range(0, 4): 11        name = input("\nEnter a name for Orbian " 12                    + str(i + 1) + ": ") 13        headRadius = randint(2, 5) 14        bodyRadius = randint(3, 9) 15        bodyHeight = randint(5, 15) 16        family.append(Orbian(name, headRadius, 17                            bodyRadius, bodyHeight)) 18    print("\nCreating your Orbian Family", end="") 19    thinking() 20    done = False 21    while not done: 22        print() 23        print("Menu") 24        print("\t1) Meet Orbian Family") 25        print("\t2) Compare Orbians") 26        print("\t3) Orbian Info") 27        print("\t4) Create Orbian Baby") 28        print("\t5) Send to Pasture") 29        print("\t6) Orbian Thanos") 30        print("\t7) Quit") 31        choice = int(input("Choose an option: ")) 32        print() 33        if choice == 1: 34            listFamily(family) 35        elif choice == 2: 36            compare(family) 37        elif choice == 3: 38            info(family) 39        elif choice == 4: 40            createBaby(family) 41        elif choice == 5: 42            toPasture(family) 43        elif choice == 6: 44            thanosSnap(family) 45        elif choice == 7: 46            done = True 47    print("Thanks for playing Orbian Family!!!") </pre>

## Student cognitive process???



low-performing students exhibit longer delays in their keystrokes



## Methods

Data Mining

Learning Analytics

- We are collecting from ~ 100 students in CS1 at USU
- We are analyzing the data using data mining and descriptive statistics
- We are building ML models for downstream tasks

## Challenge Area

Best Practices

How to convert keystroke-related statistics and insights into **actionable recommendations** that help students become better programmers?

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🌐 https://dsa.cs.usu.edu/



Our paper: [qcco.de/bf3wRN](http://qcco.de/bf3wRN)

