**Take Home Sheet 2, 15-OCTOBER-2025**

Activities to read and try out this week. Feel free to invite your parents to follow along. No grades, no stress: Just ideas and a little Python.

Work on your text project if you haven’t finished!

**First activity:** Predict out loud what this Python code will do. Bonus activity: Run the code to test your predictions. Tell us how you did!

**if (25 % 7 == 4):**

**print(“The correct number is”, 4)**

**if (3+4 == 7 and 4+5 == 20):**

**print(“6” + “7”)**

**elif (2 \*\* 3 != 6):**

**user\_input = input(“question:\n”)**

**print(user\_input)**

**else:**

**print(“else”)**

**—---------------------------------------------**

**user\_age = int(input(“What is your age:\t”)**

**if (user\_age / 10 == 10):**

**if (user\_age % 10 == 0):**

**print(“Nice!”)**

**else:**

**print(“Cool!”)**

**else:**

**print(f”You are {user\_age} years old”)**

**Second activity:** The King called the three wisest men in the country to his court to decide who would become his new advisor. He placed a hat on each of their heads, such that each wise man could see all of the other hats, but none of them could see their own. Each hat was either white or blue. The king gave his word to the wise men that **at least one of them was wearing a blue hat**; in other words, there could be one, two, or three blue hats, but not zero. The king also announced that **the contest would be fair to all three men**. The wise men were also forbidden to speak to each other. The king declared that whichever man stood up first and correctly announced the colour of his own hat would become his new advisor. The wise men sat for a very long time before one stood up and correctly announced the answer. What did he say, and how did he work it out?

**Third activity:** There is a peculiar island inhabited by two types of people: Knights and Knaves. Knights and Knaves are indistinguishable in appearance; but they have a key behavioral difference. In response to a direct question a Knight always tells the truth and a Knave always lies. Now one day suppose you find yourself on the Island of Knights and Knaves walking along a path. You see that just up ahead this path branches into two paths. You have been told about this path in advance; and so you know that one of the branches leads into a miserable swamp full of vicious tigers. The other branch leads to a safe and pleasant town on the coast, which is where you want to go. Standing at attention right at the fork in the path you see a citizen of the island. You have also been told that they know which path is which. How can you ask them questions in order to determine which path to take? If your solution requires two or more questions: Is there a way to get the crucial information about which path to take by **asking only one question?**

**Fourth activity:** Your friend David Hilbert just inherited a hotel that happens to have an infinite number of rooms. On one particular night every room is occupied by a guest and so the neon sign out front says “No Vacancy”. A weary traveler arrives at the hotel and enters the office where David is sitting in a chair. The traveler asks “Can you find me a room?” David immediately says “Yes of course. There are no empty rooms but fortunately there are infinitely many of them; so I can fit you up with an empty room anyway. That is how infinity works!” What do you suppose David Hilbert does next?

Added detail: In his hotel office David Hilbert has a microphone. The microphone is connected to little speakers, one in each room of the hotel. By talking into the microphone David Hilbert can make an announcement that will be heard by each guest. If he makes a request of the guests: They will do their very best to comply.