

### Homework 1

Due Date: February 4

There are 4 problems in this homework assignment. Submit the codes for all problems in a notebook file on Canvas. All the problems are from our textbook:

1. The German mathematician Gottfried Leibniz developed the following method to approximate the value of  $\pi$ :

$$\pi/4 = 1 - 1/3 + 1/5 - 1/7 + \dots$$

Write a program that allows the user to specify the number of iterations used in this approximation and that displays the resulting value of  $\pi$ .

2. Teachers in most school districts are paid on a schedule that provides a salary based on their number of years of teaching experience. For example, a beginning teacher in the Lexington School District might be paid \$30,000 the first year. For each year of experience after this first year, up to 10 years, the teacher receives a 2% increase over the preceding value. Write a program that displays a salary schedule, in tabular format, for teachers in a school district. The inputs are the starting salary, the percentage increase, and the number of years in the schedule. Each row in the schedule should contain the year number and the salary for that year.
3. In the game of Lucky Sevens, the player rolls a pair of dice. If the dots add up to 7, the player wins \$4; otherwise, the player loses \$1. Suppose that, to entice the gullible, a casino tells players that there are lots of ways to win: (1,6), (2,5), and so on. A little mathematical analysis reveals that there are not enough ways to win to make the game worthwhile; however, because many people's eyes glaze over at the first mention of mathematics, your challenge is to write a program that demonstrates the futility of playing the game. Your program should take as input the amount of money that the player wants to put into the pot, and play the game until the pot is empty. At that point, the program should print the number of rolls it took to break the player, as well as maximum amount of money in the pot.
4. The payroll department keeps a list of employee information for each pay period in a text file. The format of each line of the file is the following:

*< lastname > < department > < hourlywage > < hoursworked >*

Write a program that inputs a filename from the user and prints to the terminal a report of the wages paid to the employees for the given period. The report should be in tabular format with the appropriate header. Each line should contain an employee's name, their department, the hours worked, and the total wages paid for that period.