Labs

(2) Level A	(2) Level B	(1) Level C
100 or Bust	Tic Tac Toe Version Two	Calendar
Various Methods	Recursive Methods	Pig Latin

100 or Bust

Write a program that allows (2-5) players to alternate playing the game of 100 or bust until there is a winner. The game will start by getting players names and then generate a random turn order.

How the games works:

- Turns alternate until there is a winner.
- Player turns
    - A play has the following choices each turn
        - Roll dice
            - Non-doubles
                - The total of the two dice are added to the turn total
            - Doubles
                - Turn total is set to 0
                - The current player gains no points this turn and it becomes the next players turn.
        - Stop
            - All points in turn total this turn are added the players score
            - If the player has 100 or more points he / she wins the games.

Required Methods:

- rollDie
    - Receives no parameters
    - Returns a random int from [1 to 6]
- findWinner
    - Receives two arrays
        - names – the names of the players
        - scores – the scores for each player
    - Returns a Sting containing the name of the winning player or null if there is no winner yet.
- Shuffle
    - Receives an array of Strings
    - Shuffles the names in the array
    - This is a void method

Required Data:

- An array of Strings that contains the player names
    - Note: call shuffle after all the names are entered
- An array of ints
    - Stores the scores of each player

Rubric (counts as 1 other grade)

Points	Task
15	Required Data
15	rollDie Method
15	Check Winner Method
15	Shuffle Method
10	Random Play Order
10	Turns Work
10	Winning Works
10	Formatting and neatness

Various Methods

Write a program with a menu that loops. The menu options will be letter range, number range, time to minutes, number to text, maker's favorites and exit.

The out for each non-exit option will be obtained from calling one of the following methods:

- Letter Range
  - Receives two chars, the starting and ending points of the range
  - Returns a String containing the letters from the starting letter to the ending letter
- Number Range
  - Receives two ints, the starting and ending points of the range
  - Returns a String containing the numbers from the starting int to the ending int
- Time to Minutes
  - Receives two positive integers, hours and minutes.
  - Returns an int, the number of minutes in the given time
- Number to Text
  - Receives a single digit number
  - Returns a String, the text version of the number
- Maker's Favorites
  - Receives no parameters
  - The method will print the maker's favorite food, game, movie, song & sport
  - This method does not return anything

Rubric (counts as 1 other grade)

Points	Task
15	Working menu
15	Letter Range
15	Number Range
15	Time to Minutes
15	Number to Text
15	Maker's Favorites
10	Formatting and neatness

Tic Tac Toe Version Two

Write a program that will allow two players to play a single game of tic-tac-toe. The first player will play as 'X' and the second player will play as 'O'. When the game ends the program will display the player that won or CAT.

Required methods:

- Display Board
  - Receives the game board
  - Displays it to the screen
- Is Winner
  - Receives the game board and a character
  - Returns true if the received character has three in row and false if it does not.
- Is Cat
  - Receives the game board
  - Returns true when all the locations are full and neither X nor O won. It returns false under all other circumstances.

Rubric (counts as 1 minor grade)

Points	Task
10	Gets input in x and y from player X and O
10	Alternates turns
10	Does not allow invalid moves
10	Ends when X or O wins
10	Ends when the game is a cat
10	Is Winner Method
10	Display Board Method
10	Is Cat Method
20	Formatting and neatness

Recursive Methods

Write a menu driven program with the following options: summation, factorial, power, factors, and Fibonacci numbers. Each option will be handled with a recursive method.

Required Methods:

- Summation
  - Receives two ints, the starting and ending points of a summation
  - Returns the summation
- Factorial
  - Receives an int
  - Returns the factorial
- Power
  - Receives two positive integers, a base and exponent.
  - Return the base raised to the exponent

Rubric (counts as 1 minor grade)

Points	Task
30	Summation
30	Factorial
30	Power
10	Formatting and neatness

Calendar

Write a program that will take a month and year as input. The program will not accept any year less than 1900 or any month number that is invalid.

Once valid data is gathered the program will print a calendar that includes the month name, year, days of the week and grid lining up the dates with the correct days of the week.

Required Methods:

- monthName
  - Receives an int for the month number
  - Returns a String containing the name of the month.
- leapYear
  - Receives an int for the year
  - Returns true if the year is a leap year and false if it is not.
- daysInMonth
  - Receives ints for year and month
  - Returns the number of days in the month
    - For February use the leapYear method.
- getStartingDay
  - Receives ints for the month and year
  - Returns the week day the month starts on:
    - 0 – Monday
    - 1 – Tuesday
    - 2 – Wednesday
    - 3 – Thursday
    - 4 – Friday
    - 5 – Saturday
    - 6 – Sunday
- printCalendar
  - Receives ints for month and year
  - Prints the calendar
    - You will need to use monthName, leapYear, daysInMonth and getStartingDay.
    - Your weeks must start on Sunday

Steps to determine the start date:

- Calculate the total number of days from January 1st 1900 to the first of the month.
- Modulus that total by 7 and you will have a number from 0 to 6. This number will tell you what day your month starts on.

Rubric (counts as 2 minor grades)

Points	Task
5	Only accepts valid years
5	Only accepts valid months
10	January works for any year
10	February works for any year
10	Every month after February works for any year
10	Leap year method
10	Month name method
10	Days in month method
10	Get starting day method
10	Print calendar method
10	Formatting and neatness

Pig Latin

Write a program that allows the user to convert a sentence to Pig Latin.

Basic Rules:

- if the word starts with a consonant then move the leading consonants to the end of the word and then add "ay" to the end of the word
- If the word starts with a vowel add "way" to the end of the word

Special Case Rules:

- When a y is the first letter treat it as a consonant. Treat all y's after the first letter of a word as vowels
- If the words first vowel is a 'u' and the letter before it is a 'q', move everything up to and including the u to the end of the word and then add "ay"

Required Methods:

- isVowel
  - Receives a char
  - Returns true if it is a vowel and false if it is not
  - Note: y is not a vowel
- convertSingleWord
  - Receives a single word (String)
  - Returns a String that is the Pig Latin form of the word that was received
  - Uses isVowel
- convertSentence
  - Receives a sentence of text (String)
  - Returns a String that is the Pig Latin form of the received sentence
  - Uses convertSingleWord

Rubric (counts as 2 minor grads)

Points	Task
10	Gets a line of text from the user
20	Normal words starting with a vowel
20	Normal words starting with a consonant
20	Special case y
20	Special case qu
10	Formatting and neatness