Coding Challenge: Showcase Your Skills!

Welcome to the coding challenge! We're excited to see your problem-solving skills and coding prowess in action. Below, you'll find a series of problems to solve. Each problem requires you to write code to achieve the specified outcomes. Once you've completed the challenges, follow the instructions at the end to submit your solutions via GitHub.

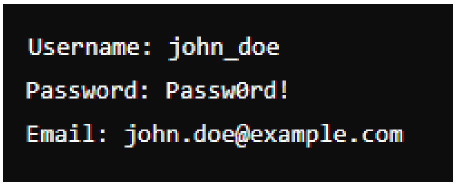
Problem 1: User Login Validation

Description:
Write a program that displays a menu with fields for Username, Password, and Email. The program should validate the following:

1. Entered Username:
    1. The username should not be empty.
    2. It should not exceed more than 50 characters.
2. Entered password:
    1. The password must be at least 8 characters long.
    2. It should contain at least one special symbol.
    3. It should have one or more numbers.
    4. It should have and one or more uppercase and lowercase characters.
3. Entered email address:
    1. The email should have “@” symbol.
    2. It should have alphanumeric characters before and after the @ symbol
    3. After the @ symbol, it should have letters having . character in between.

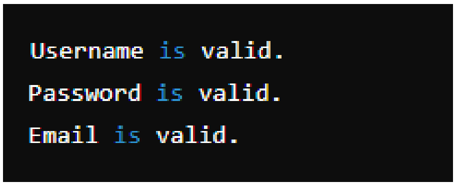
Example Inputs and Outputs:

Input:



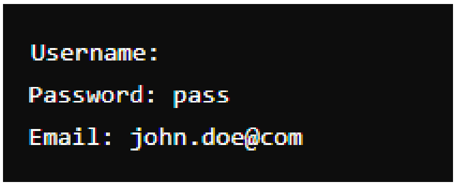
```
Username: john_doe
Password: Passw0rd!
Email: john.doe@example.com
```

Output:



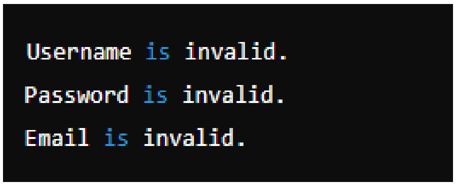
```
Username is valid.
Password is valid.
Email is valid.
```

Input:



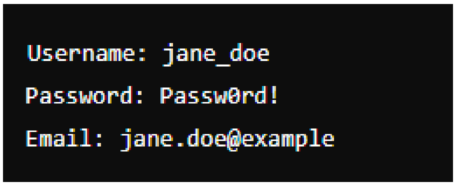
```
Username:
Password: pass
Email: john.doe@com
```

Output:



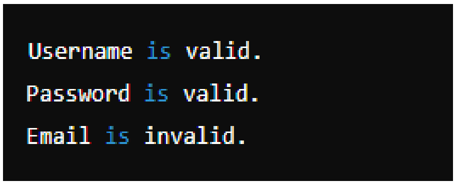
```
Username is invalid.
Password is invalid.
Email is invalid.
```

Input:



```
Username: jane_doe
Password: Passw0rd!
Email: jane.doe@example
```

Output:



```
Username is valid.
Password is valid.
Email is invalid.
```

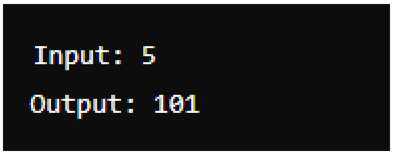
Problem 2: Convert Decimal to Binary

Description:
Write a program that converts a positive decimal number to its binary equivalent.

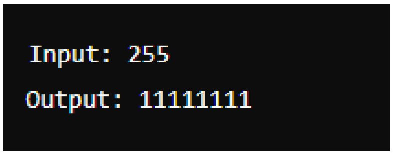
Steps of the Algorithm:
To convert a positive decimal number to binary, you can use the following algorithm:

1. Divide the number by 2.
2. Record the remainder. (This will be 0 or 1)
3. Update the number to be the quotient of the division.
4. Repeat steps 1-3 until the number becomes 0.
5. The binary equivalent is the sequence of remainders read from bottom to top.

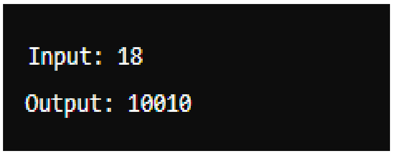
Example Inputs and Outputs:



```
Input: 5
Output: 101
```



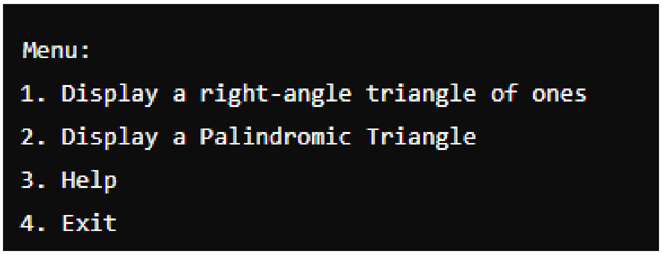
```
Input: 255
Output: 11111111
```



```
Input: 18
Output: 10010
```

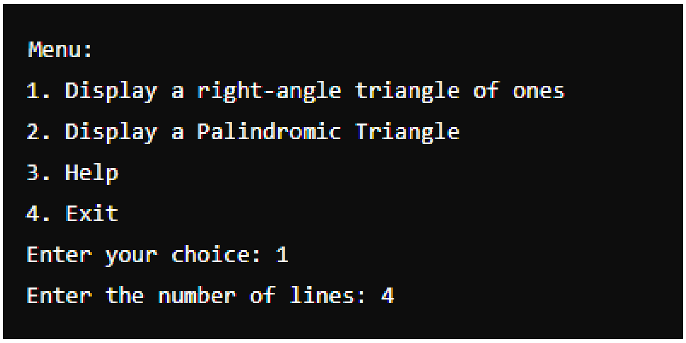
Problem 3: Interactive Triangle Display

Description:
Write a program that displays a menu with the following options:

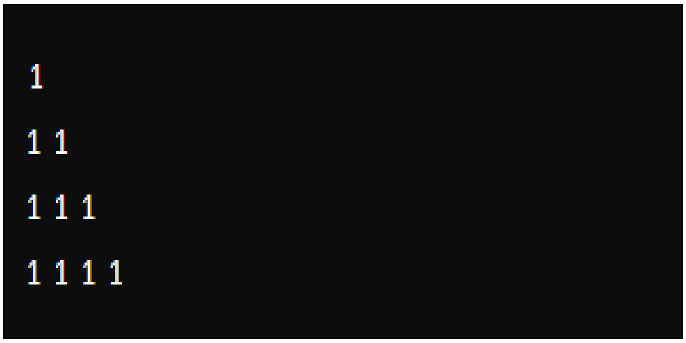


```
Menu:
1. Display a right-angle triangle of ones
2. Display a Palindromic Triangle
3. Help
4. Exit
```

Example Inputs and Outputs:
A user can enter a choice which can be from 1-4 and based on the choice, he can be prompted for another input as follows:

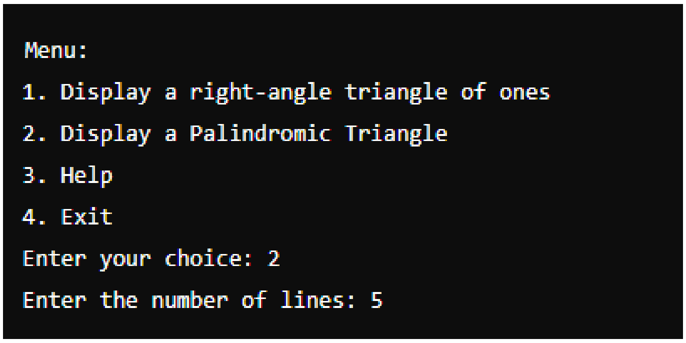


```
Menu:
1. Display a right-angle triangle of ones
2. Display a Palindromic Triangle
3. Help
4. Exit
Enter your choice: 1
Enter the number of lines: 4
```



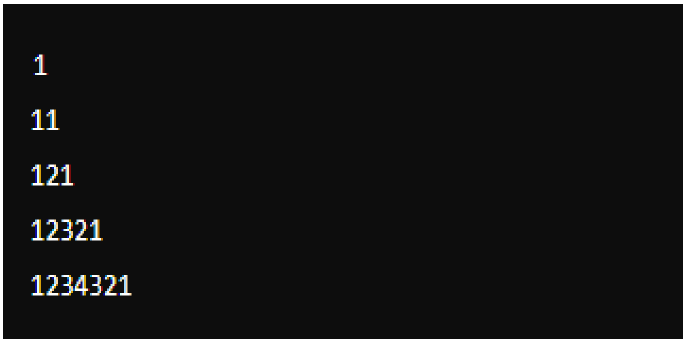
```
1
1 1
1 1 1
1 1 1 1
```

Input



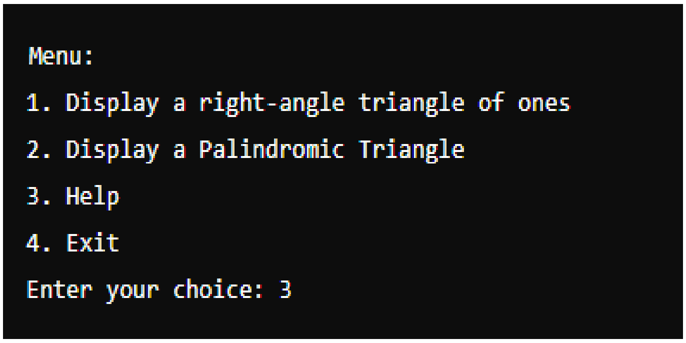
```
Menu:
1. Display a right-angle triangle of ones
2. Display a Palindromic Triangle
3. Help
4. Exit
Enter your choice: 2
Enter the number of lines: 5
```

Output



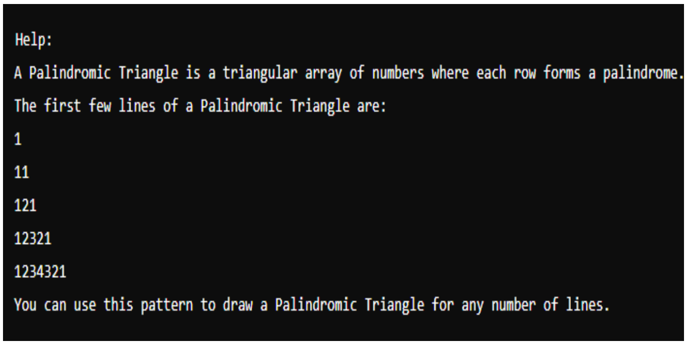
```
1
11
121
12321
1234321
```

Input



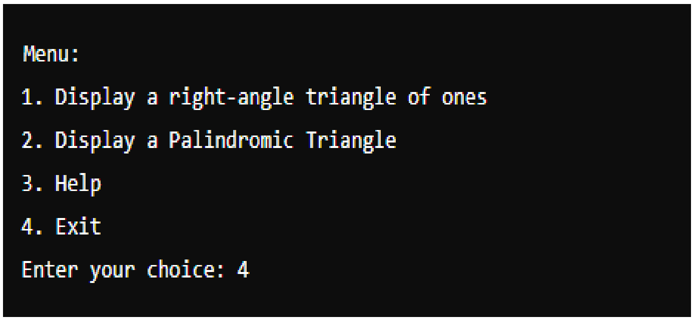
```
Menu:
1. Display a right-angle triangle of ones
2. Display a Palindromic Triangle
3. Help
4. Exit
Enter your choice: 3
```

Output



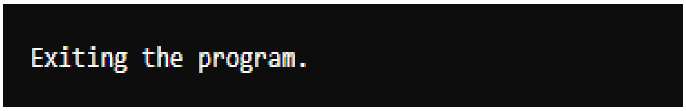
```
Help:
A Palindromic Triangle is a triangular array of numbers where each row forms a palindrome.
The first few lines of a Palindromic Triangle are:
1
11
121
12321
1234321
You can use this pattern to draw a Palindromic Triangle for any number of lines.
```

Input



```
Menu:
1. Display a right-angle triangle of ones
2. Display a Palindromic Triangle
3. Help
4. Exit
Enter your choice: 4
```

Output



```
Exiting the program.
```

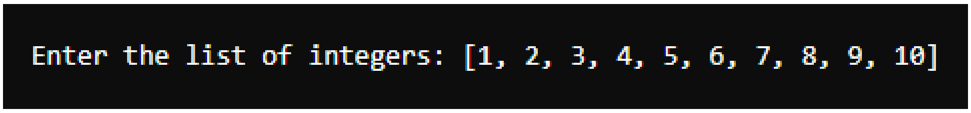
Problem 4: Generating Even Squares

Description:
Write a program that takes a list of integers as input and performs the following operations:

1. Creates a new list of squares of even numbers from the original list using list comprehension.
2. Slices the original list to extract a sublist from a given start index to a given end index

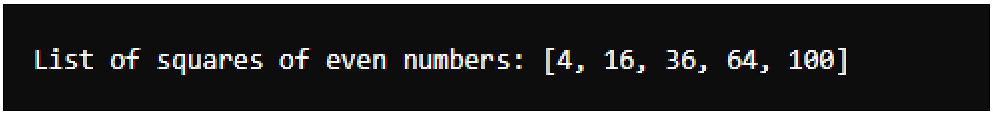
Example Inputs and Outputs for “List of Squares of Even Numbers”:

Input



```
Enter the list of integers: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
```

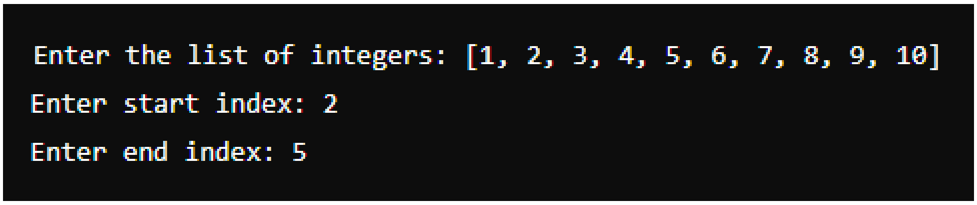
Output



```
List of squares of even numbers: [4, 16, 36, 64, 100]
```

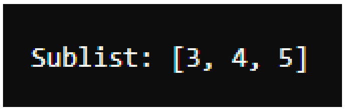
Example Inputs and Outputs for “Slice a Sublist from the List”:

Input



```
Enter the list of integers: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
Enter start index: 2
Enter end index: 5
```

Output



```
Sublist: [3, 4, 5]
```

Submission Guideline

Once you have completed the problems, follow these steps to submit your solutions:

Step 1: Fork the Repository
- Navigate to this repository: https://github.com/CodelineGitHub/CodelineProblemSolving
- Click on the "Fork" button at the top-right corner of the page to create a copy of the repository under your own GitHub account.

Step 2: Clone the Forked Repository
- Open your terminal or command prompt.
- Clone the repository to your local machine using the following command:

```
git clone https://github.com/your-username/repo-name.git
```

Step 3: Create a new branch
- Navigate to the cloned repository directory

```
cd repo-name
```

- Create a new branch for your code submissions (Replace your-name with your name in your-name-submission-branch):

```
git checkout -b your-name-submission-branch
```

Step 4: Add Your Code
- Create program files in the directory for each problem separately
- For Example: problem_1.py, problem_2.py, problem_3.py and problem_4.py
- Feel free to write the code in any desired language

Step 5: Commit your changes
- Run the following commands to commit your changes:

```
git add *
git commit -m "Added solutions to all problems"
```

Step 6: Push Your Branch to GitHub

- Run the following commands to upload the changes to the forked github repository (Replace your-name with your name in your-name-submission-branch):

```
git push origin your-name-submission-branch
```

Step 7: Create a Pull Request

- Go to your forked repository on GitHub.
- You should see a prompt to create a pull request. Click on "Compare & pull request".
- Provide a title and description for your pull request, then click "Create pull request".

Step 8: Notify Codeline

- Notify via email that you have submitted your solution by sending the link of your Pull Request along with your Name, Phone Number.

Note: If you face any issues in the process above, Please do the following:

- Watch https://www.youtube.com/watch?v=a_FLqX3vGR4
- Contact Codeline via email.

We take plagiarism very seriously.

All submitted code will be checked for originality using an open-source plagiarism detection tool called Moss (Measure of Software Similarity) (https://theory.stanford.edu/~aiken/moss/).

If more than 60% of the code is found to be similar to other submissions or any publicly available source, the pull request will be ignored and your submission will be considered invalid. Please ensure that all the code you submit is your own work. If you have any questions or need clarification on any part of the assignment, feel free to reach out to Codeline.

Thank you for your cooperation.