DUBLIN CITY UNIVERSITY
NATIONAL INSTITUTE FOR DIGITAL LEARNING
OPEN EDUCATION

Module: C2: OBJECT ORIENTED PROGRAMMING WITH JAVA

Programme(s): BSC IN INFORMATION TECHNOLOGY
BSC IN MANAGEMENT OF INFO TECH /INFO SYST
Certificate in Software Development
Higher Diploma in Software Development

Assignment 1 2020–2021

Question 1 **(20 marks)**

Write a Java program that accepts a user input of an integer in the range of 1,000 to 999,999 inclusive. The program should accept a user input containing a comma, to separate thousands from hundreds. The user should be informed if an invalid input occurs, and asked to try again. When a valid number is entered, the program should display the number that was entered without a comma.

Example program execution:

```
Enter an integer between 1,000 and 999,999: 45,234
The number entered (without a comma) is: 45234
```

Question 2 **(20 marks)**

Write a program that generates a sequence of 5 random die tosses and for each die toss, ask the user to guess what it will be. The program should validate that the user input is an integer between 1 and 6 inclusive. If the user guesses correctly, give a message to say they guessed correctly and keep track of how many they get right. If they guess incorrectly, inform them that they guessed incorrectly, and let them know what the die toss was.

At the end show the total number of correct guesses.

Example program execution:

```
Guess the next dice throw (1-6): 8
Number must be between 1 and 6 inclusive, please try again
Guess the next dice throw (1-6): y
Number must be an integer, please try again
Guess the next dice throw (1-6): 6
Congratulations, you guessed right!
Guess the next dice throw (1-6): 5
Hard luck, last throw was 2
Guess the next dice throw (1-6): 3
Congratulations, you guessed right!
Guess the next dice throw (1-6): 1
Hard luck, last throw was 4
Guess the next dice throw (1-6): 4.5
Number must be an integer, please try again
Guess the next dice throw (1-6): 4
Hard luck, last throw was 5

You got 2 right out of 5
```

Question 3 **(30 marks)**

Write a Java program that prompts the user to enter an integer that is odd, in the range of 3 to 15 inclusive. The program should validate the user entry and inform the user if an invalid number is entered. When a valid number is entered, the program should generate a diamond shape, using the @ symbol. The number entered will determine the size of the diamond. For example: if the user enters the number 3, then a diamond outline of 3 rows should be displayed.

Example program execution:

```
Enter an integer that is odd, in the range of 3 to 15 (inclusive): 3
 @
@ @
 @
```

Example program execution:

```
Enter an integer that is odd, in the range of 3 to 15 (inclusive): 7
   @
  @ @
 @   @
@     @
 @   @
  @ @
   @
```

Example program execution:

```
Enter an integer that is odd, in the range of 3 to 15 (inclusive): t
Invalid entry, number must be an integer.
Enter an integer that is odd, in the range of 3 to 15 (inclusive): 8.5
Invalid entry, number must be an integer.
Enter an integer that is odd, in the range of 3 to 15 (inclusive): 16
Invalid entry, number must be in range, and must be odd.
Enter an integer that is odd, in the range of 3 to 15 (inclusive): 13
      @
     @ @
    @   @
   @     @
  @       @
 @         @
@           @
 @         @
  @       @
   @     @
    @   @
     @ @
      @
```

Question 4 **(30 marks)**

Write a Java method to check whether a string is a valid code. The program should display the rules for a code to be valid (see below), prompt the user to enter a code, validate the user's entry, and inform the user whether the code was valid or invalid. If the code was invalid, the program should prompt the user to enter a code again.

Rules for a code to be valid:

1. Code must contain no spaces
2. Code must have between 5 and 10 characters
3. Code must begin with \ and must end with \
4. Code must contain at least one lowercase letter and at least one uppercase letter

Example program execution:

```
1. A code must contain no spaces
2. A code must have between 5 and 10 characters (inclusive)
3. A code must begin with \ and must end with \
4. A code must contain at least one lowercase letter and at least one
uppercase letter
Please enter a code: d
Code must start with \
Code is invalid. Please try again.
Please enter a code: \d
Code must end with \
Code is invalid. Please try again.
Please enter a code: \d\
Code must be between 5 and 10 characters in length.
Code is invalid. Please try again.
Please enter a code: \def\
Code must contain at least one uppercase letter.
Code is invalid. Please try again.
Please enter a code: \deF\
Code is valid.
```

Deliverables:

A zip file containing:

For Question 1: A program called c*2a1**q1**_2020_StudentName.java*

For Question 2: A program called c*2a1**q2**_2020_StudentName.java*

For Question 3: A program called c*2a1**q3**_2020_StudentName.java*

For Question 4: A program called c*2a1**q4**_2020_StudentName.java*

- **All programs must**
  - INCLUDE COMMENTS
  - INCLUDE CODE THAT IS CORRECTLY ALIGNED AND INDENTED
  - COMPILE WITH NO ERRORS
  - RUN WITHOUT CRASHING

BEFORE SUBMITTING AN ASSIGNMENT, PLEASE FAMILIARISE YOURSELF WITH THE ASSIGNMENT REGULATIONS. THESE ARE AVAILABLE AS APPENDIX 3 OF THE COURSE HANDBOOK 2020–2021. (The Course Handbook is available here: http://moodle.dcu.ie/mod/resource/view.php?id=254230)

YOU SHOULD ALSO ENSURE THAT YOUR ASSIGNMENT FILES ARE CORRECTLY NAMED (SEE SECTION ON *Saving and Naming Your Online Assignment File* IN THE ASSIGNMENT REGULATIONS) AND THAT YOUR FILES ARE IN A COMPATIBLE FORMAT (SEE APPENDIX 10 OF THE COURSE HANDBOOK 2020–2021).