PROGRAMMING FUNDAMENTALS

Fall XXXX

First DEMO exam. Part B

All the exercises must be solved in the multiproject solution provided…

EXERCISE 1: The Travel Advisor [3.5 points] Complete a "travel advisor" program that advises its user on where to spend their holiday depending on their **age** and two personality traits: **extraversion** and **anxiety**.

Extraversion can take two values: *sociable* or *reserved*
Anxiety can take two values: *anxious* or *calm*

Regarding the personality traits the following categories are considered:

Personality category **A**: Sociable and Calm
Personality category **B**: Sociable and Anxious
Personality category **C**: Reserved and Calm
Personality category **D**: Reserved and Anxious

Regarding the age, three age groups are contemplated
Age group **1**: age $\in$ [18,30)
Age group **2**: age $\in$ [30, 55]
Age group **3**: age $\in$ (55,64]

(The program cannot give advice to people younger than 18 or older than 64)

Advice is given according to the following table:

		AGE GROUP		
		1	**2**	**3**
PERSONALITY	**A**	NAMIBIA	UGANDA	KENIA
	B	ALASKA		AUSTRALIA
	C	INDIA	NEPAL	
	D	JAPAN		

Follow the instructions given in the code. You're not told where to use SWITCH-based structures and where to use IF-ELSE-based structures BUT you MUST use a SWITCH-based structure at least once and an IF-ELSE-based structure at least once.

The following images show the outcome of the program in some situations:

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THE EXAM 2020 TRAVEL ADVISOR
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Good day user, please tell me your age: 29
Do yo regard yourself as SOCIABLE (S/s) or as RESERVED (R/r): s
Do you consider yourseld CALM (C/c) or ANXIOUS (A/a): c

Well, your personality category is: A
And your age group is: 1

According to all this my advice is that you travel to NAMIBIA
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THE EXAM 2020 TRAVEL ADVISOR
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Good day user, please tell me your age: 30
Do yo regard yourself as SOCIABLE (S/s) or as RESERVED (R/r): s
Do you consider yourseld CALM (C/c) or ANXIOUS (A/a): a

Well, your personality category is: B
And your age group is: 2

According to all this my advice is that you travel to ALASKA
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THE EXAM 2020 TRAVEL ADVISOR
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Good day user, please tell me your age: 55
Do yo regard yourself as SOCIABLE (S/s) or as RESERVED (R/r): r
Do you consider yourseld CALM (C/c) or ANXIOUS (A/a): c

Well, your personality category is: C
And your age group is: 2

According to all this my advice is that you travel to NEPAL
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THE EXAM 2020 TRAVEL ADVISOR
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Good day user, please tell me your age: 56
Do yo regard yourself as SOCIABLE (S/s) or as RESERVED (R/r): s
Do you consider yourseld CALM (C/c) or ANXIOUS (A/a): a

Well, your personality category is: B
And your age group is: 3

According to all this my advice is that you travel to AUSTRALIA
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THE EXAM 2020 TRAVEL ADVISOR
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Good day user, please tell me your age: 64
Do yo regard yourself as SOCIABLE (S/s) or as RESERVED (R/r): r
Do you consider yourseld CALM (C/c) or ANXIOUS (A/a): a

Well, your personality category is: D
And your age group is: 3

According to all this my advice is that you travel to JAPAN
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THE EXAM 2020 TRAVEL ADVISOR
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Good day user, please tell me your age: 30
Do yo regard yourself as SOCIABLE (S/s) or as RESERVED (R/r): s
Do you consider yourseld CALM (C/c) or ANXIOUS (A/a): c

Well, your personality category is: A
And your age group is: 2

According to all this my advice is that you travel to UGANDA
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```
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THE EXAM 2020 TRAVEL ADVISOR
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Good day user, please tell me your age: 56
Do yo regard yourself as SOCIABLE (S/s) or as RESERVED (R/r): s
Do you consider yourseld CALM (C/c) or ANXIOUS (A/a): c

Well, your personality category is: A
And your age group is: 3

According to all this my advice is that you travel to KENIA
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THE EXAM 2020 TRAVEL ADVISOR
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Good day user, please tell me your age: 18
Do yo regard yourself as SOCIABLE (S/s) or as RESERVED (R/r): r
Do you consider yourseld CALM (C/c) or ANXIOUS (A/a): c

Well, your personality category is: C
And your age group is: 1

According to all this my advice is that you travel to INDIA
```

EXERCISE 2 [3.5 points] Complete a program for playing a single game of EVEN ODDITY. This game is played with three dice, two for the player and one for the croupier. These are the rules

1. The player throws his/her two dice
2. If the result is…
   a. 1+1 (SNAKE EYES) the player wins with SNAKE EYES and the game ends
   b. Two even dice, the player wins with DOUBLE EVENNESS
   c. Two odd dice, the player loses with DOUBLE ODDITY
3. If the game has not ended in the previous stage (one die is even, the other is odd), the croupier throws his/her die (only one)
4. If considering the three dice, there are…
   a. More even dice than odd dice, the player wins with AN EVEN MAJORITY
   b. More odd dice than even dice, the player loses with AN EXCESSIVE ODDITY

The following images show different outcomes of the game

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A PLEASANT NIGHT AT THE CASINO
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Welcome to the casino!!!

Now gambler, please tell me your name: J. DOE

J. DOE press any key to throw YOUR dice

      YOUR DICE: 1    1

CONGRATULATIONS J. DOE you win with SNAKE EYES
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```
A PLEASANT NIGHT AT THE CASINO
----------------------------

Welcome to the casino!!!

Now gambler, please tell me your name: J. DOE

J. DOE press any key to throw YOUR dice

      YOUR DICE: 2    3

J. DOE press any key and I'll throw MY die

      MY DIE: 4

CONGRATULATIONS J. DOE you win with AN EVEN MAJORITY
```

```
A PLEASANT NIGHT AT THE CASINO
----------------------------

Welcome to the casino!!!

Now gambler, please tell me your name: K. DOVE

K. DOVE press any key to throw YOUR dice

      YOUR DICE: 5    6

K. DOVE press any key and I'll throw MY die

      MY DIE: 3

Bad luck K. DOVE you lose with AN EXCESSIVE ODDITY
```

```
A PLEASANT NIGHT AT THE CASINO
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Welcome to the casino!!!

Now gambler, please tell me your name: K. DOVE

K. DOVE press any key to throw YOUR dice

        YOUR DICE: 1    3

Bad luck K. DOVE you lose with DOUBLE ODDITY
```

```
A PLEASANT NIGHT AT THE CASINO
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Welcome to the casino!!!

Now gambler, please tell me your name: P. WOLF

P. WOLF press any key to throw YOUR dice

        YOUR DICE: 4    2

CONGRATULATIONS P. WOLF you win with DOUBLE EVENNESS
```

EXERCISE 3 [1.5 points] Complete a program that "draws" the perimeter and the main diagonal of an n x n square. The characters used depend on the line: in the i-th line use digit i (e.g. use digit 1 in line 1, digit 2 in line 2 and so on). For the inner diagonal (lines from 2 to n-1), use digit 0. Do not use cursor positioning. The following images show the results for n=3, n=6 and n=8.

```
What is the value of n (n>1)? 3


1 1 1
2 0 2
3 3 3
```

```
What is the value of n (n>1)? 6


1 1 1 1 1 1
2 0         2
3   0       3
4     0     4
5         0 5
6 6 6 6 6 6
```

```
What is the value of n (n>1)? 8


1 1 1 1 1 1 1 1
2 0             2
3   0           3
4     0         4
5       0       5
6         0     6
7           0 7
8 8 8 8 8 8 8 8
```

EXERCISE 4 [1.5 points] Write a program that repeatedly rolls a die until

there are at least 2 "sixes"
and
the number of "ones" is greater than the number of "sixes" (there are more "ones" than "sixes")

The number of rollings is limited to 20. After 20 rollings the program stops regardless of the number of "ones" and "sixes"

Your program **MUST**:
- write "ones" in red
- write "sixes" in green
- and, before ending
  - write the number of "ones" obtained
  - write the number of "sixes" obtained
  - write the number of times the die was cast
  - write the reason that made the iteration terminate (see images below)

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DICE, DICE, ALWAYS DICE
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4 6 2 5 1 5 6 1 3 3 6 6 3 1 4 1 6 2 2 6

ones: 4
sixes: 6
times cast: 20

TERMINATION REASON: die cast 20 times without success
```

```
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DICE, DICE, ALWAYS DICE
----------------------

1 2 3 4 6 4 5 2 3 1 2 3 4 1 1 5 1 5 2 6

ones: 5
sixes: 2
times cast: 20

TERMINATION REASON: Right number of ones and sixes achieved
```

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DICE, DICE, ALWAYS DICE
----------------------

1 4 3 5 4 6 1 6 1

ones: 3
sixes: 2
times cast: 9

TERMINATION REASON: Right number of ones and sixes achieved
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DICE, DICE, ALWAYS DICE
----------------------

6 6 3 6 3 2 2 2 1 5 2 1 3 1 1

ones: 4
sixes: 3
times cast: 15

TERMINATION REASON: Right number of ones and sixes achieved
```