



MÜHENDİSLİK FAKÜLTESİ
BİLGİSAYAR MÜHENDİSLİĞİ BÖLÜMÜ
2019/2020 Öğretim Yılı Bahar Yarıyılı Yapısal Programlama Dersi
BÜTÜNLEME SINAVI ÖDEVİ

You are expected to design the UNO card game. The rules of this game are as follows:

- Uno game also has four different colors. These colors are: yellow, blue, green and red.
- Each color card contains numbers from 0 to 9. (2 cards from 1-9, one 0)
- For each color, there are 3 different penalty cards (2 for each). These:
 - Reverse the direction of the game (REVERSE)
 - Take 2 cards from the floor to the next player (2 CARD CHECK)
 - Bypass the next player (PASS)
- There are 2 more types of penalty cards (4 of each) that do not have any color or number. These are:
 - Get 4 cards from the ground to the next player. (4 CARD CHECK)
 - Change color. (COLOR CHANGE)
- The total number of cards in the deck is 108
- The game is played with 4 people (3 computers, 1 keyboard controlled player)
- Cards are shuffled and each player is dealt 7 cards from the deck
- The remaining cards are set aside, with the sides closed, to create a pull stack.
- The paper at the top of the pull stack is opened and laid out.
- The person to the left of the dealer of the cards starts the game. Each player must match the card in his hand with the top card on the floor.
- This matching is done with numbers or colors. For example, if there is a green 3 on the ground, the next player must play number 3 card of any color. Or can play a green card regardless of the number.
- If the player does not have a card that matches the last card in the ground, a card must be drawn from the draw deck. If it is playable with the drawn card, it can be revealed in the same round. Otherwise, the turn goes to the next player.
- The aim is for a player to finish all the cards in his hand.
- The player with a single card in hand must be called UNO. The player who does not say UNO despite having only one card in his hand, draws a card from the draw deck as a penalty.
- Penalty cards and their uses are as follows:
 - 2 CARD CHECK: This card can only be played if the number of the card on the ground is 2 (or when there is another 2 CARD CHECK card on the floor). When played with this card, the next player draws 2 cards and that hand cannot play. However, if the next player has the same penalty card in his hand, he can play it, and then the next player must take 4 cards from draw deck. In this way, all players can stack 2 CARD CHECK cards.
 - REVERSE: As long as the color of the card on the floor is suitable, it can be played regardless of the number on the card. The direction of the game (players' playing order) is reversed. This card can also be overlaid.
 - PASS: As long as the color of the card on the floor is suitable, it can be played regardless of the number on the card. Hand is passed to the next player (that player will not play)
 - 4 CARD CHECK: This card can be played regardless of the color or number of the card on the floor. When played with this card, the next player draws 4 cards and that hand cannot play. However, if the next player has the same penalty card in his hand, he can play it, and then the next player must take 8 cards from the draw deck. In this way, all players can stack 4 CARD CHECK cards in a row. In addition, the player who plays the 4 CARD CHECK card can also say what color the game will continue. For example, the last card on the ground is green 3. Regardless of the number or color, the player who comes to the line and plays 4 CARD CHECK then may request that the game continue in red.
 - COLOR CHANGE: This card can be played regardless of the color or number of the card on the floor. The player who throws this card tells the color that the game will continue.

- When a player ends all the cards in his hand and ends that hand, the other players get penalty points. The penalty score is calculated as follows: The numbers on the cards left in the player's hands are added up. If the player has a penalty card, regardless of the number or sign on this card, these cards are evaluated as 10 points. The sum of the numbers on the regular cards and the penalty cards, if any, will be the penalty points of the relevant player.
- To end the game, the penalty points of the players are checked at the end of each hand. If any player has a penalty score of 150, the game ends completely.
- In the game you designed, if the game is over, you should be asked whether you want to play or not. Accordingly, the program ends completely or the game continues from the beginning.

The game must be coded in C language.

- Unless otherwise stated, you can use of all kinds of structures and ready-made functions.
- Creating deck and shuffling cards in your code should be done using functions.
 - All players' cards must be displayed properly and clearly on the screen to see if the game is working correctly.
 - The last card thrown on the ground should be displayed on the screen.
 - When keyboard controlled player throws a card on the ground in a way that is not in compliance with the rules, a warning should be given and this warning should continue until the player plays correctly.
 - When each hand is over, the penalty points of the players must be calculated and printed on the screen.
 - The screen should be cleared when the next hand starts.
 - When the game is over, the winning player and the total penalty points of the other players (the total of the penalty points they got until the end of the game first) should be printed on the screen.
 - When the game is over, a new game should be asked if it is desired, a new game should start or the program should be ended according to the option entered.

Send the relevant code to the address of can@comu.edu.tr until 26.06.2020, 23:59 at the latest. Your e-mail code should be in the form of "studentno.c". Please write your student name, surname and number in your e-mail. The subject of the mail you send must be in the form of "Yapısal BUT Odevi". Other titles will not be evaluated.