2023 Spring CS101 Homework #3

Fortune Teller Machine

2th May 00:00 ~ 9th May 23:59

For any questions on HW3, please use the Homework 3 Q&A board at Elice.

(Korean) 학습도우미 〉 게시판 〉 Homework 3 Q&A

(English) Help Area 〉 Forums 〉 Homework 3 Q&A

Overview

In Homework 3, you should work on three tasks for a fortune teller machine with Tarot cards.

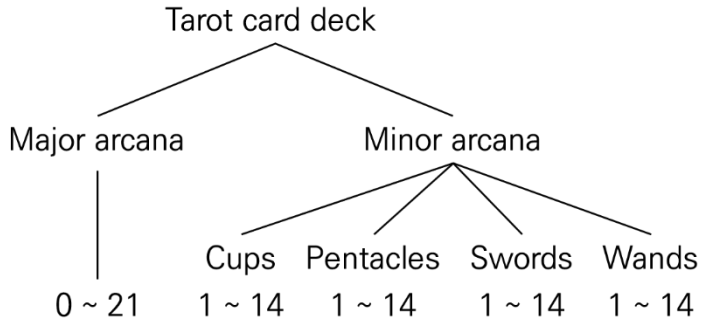
Task 1. Draw Tarot card images on canvas

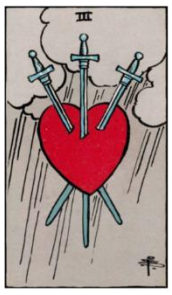
Task 2. Generate fortune text

Task 3. Complete fortune teller machine

Preliminaries

1) Composition of a deck of Tarot cards (Rider Waite)





Three
of Swords

Major 12th
The hanged man

A deck of Tarot consists of 78 cards. 22 cards for major arcana, 14 cards for each minor arcana, and in total, 4 categories of minor arcana.

FYI, here is a link to the Wikipedia document for the *Rider Waite Tarot* deck.

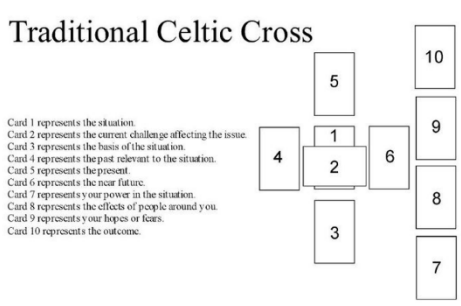
[Rider–Waite Tarot – Wikipedia]

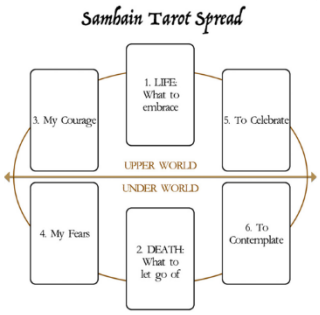
2) Concept of Tarot spread

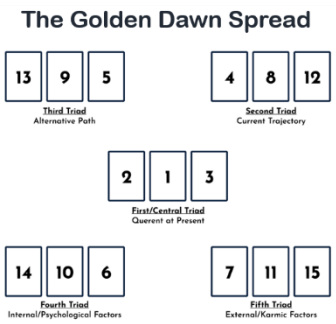
The main usage of the Tarot card is fortune-telling, definitely. There are several templates for fortune-telling, which include the features below.

a. Where and how are selected cards to be placed

b. What the card means on each position



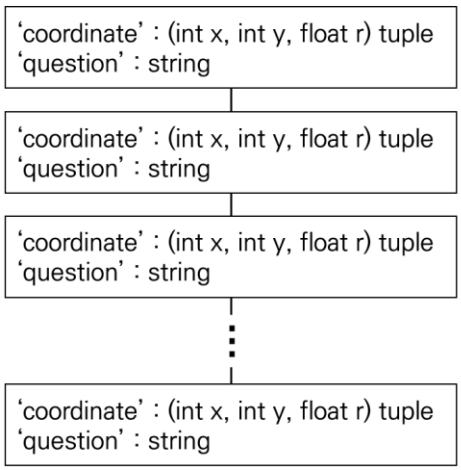




3) Data structures in this Homework

In this homework, several data structures are used along tasks.

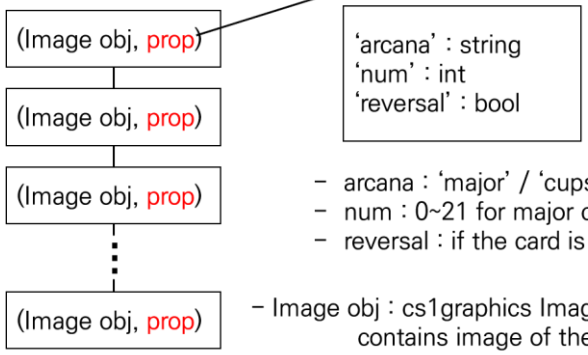
spread_style : list of dicts



- int x : x coordinate that the card to be placed
- int y : y coordinate that the card to be placed
- float r : degree value of rotation that the card should be placed
- 'question' string : a string that represent the meaning of the card placement

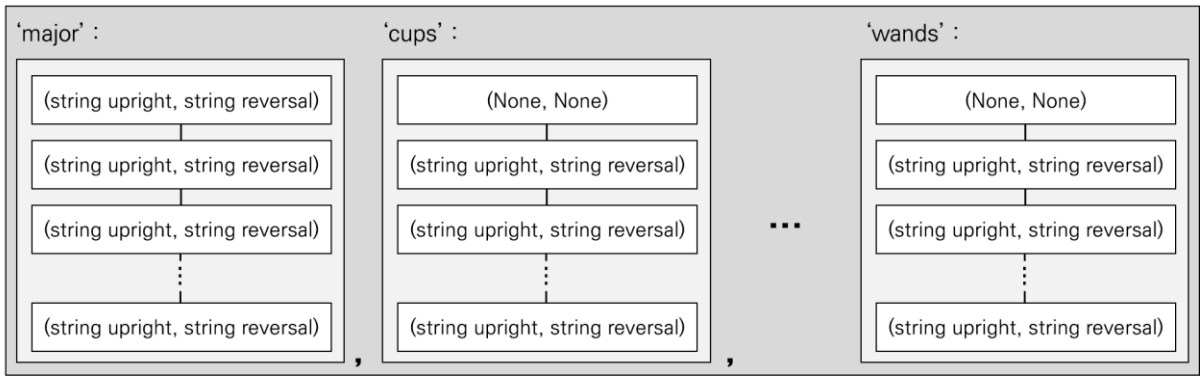
cards : list of tuples

prop : dict



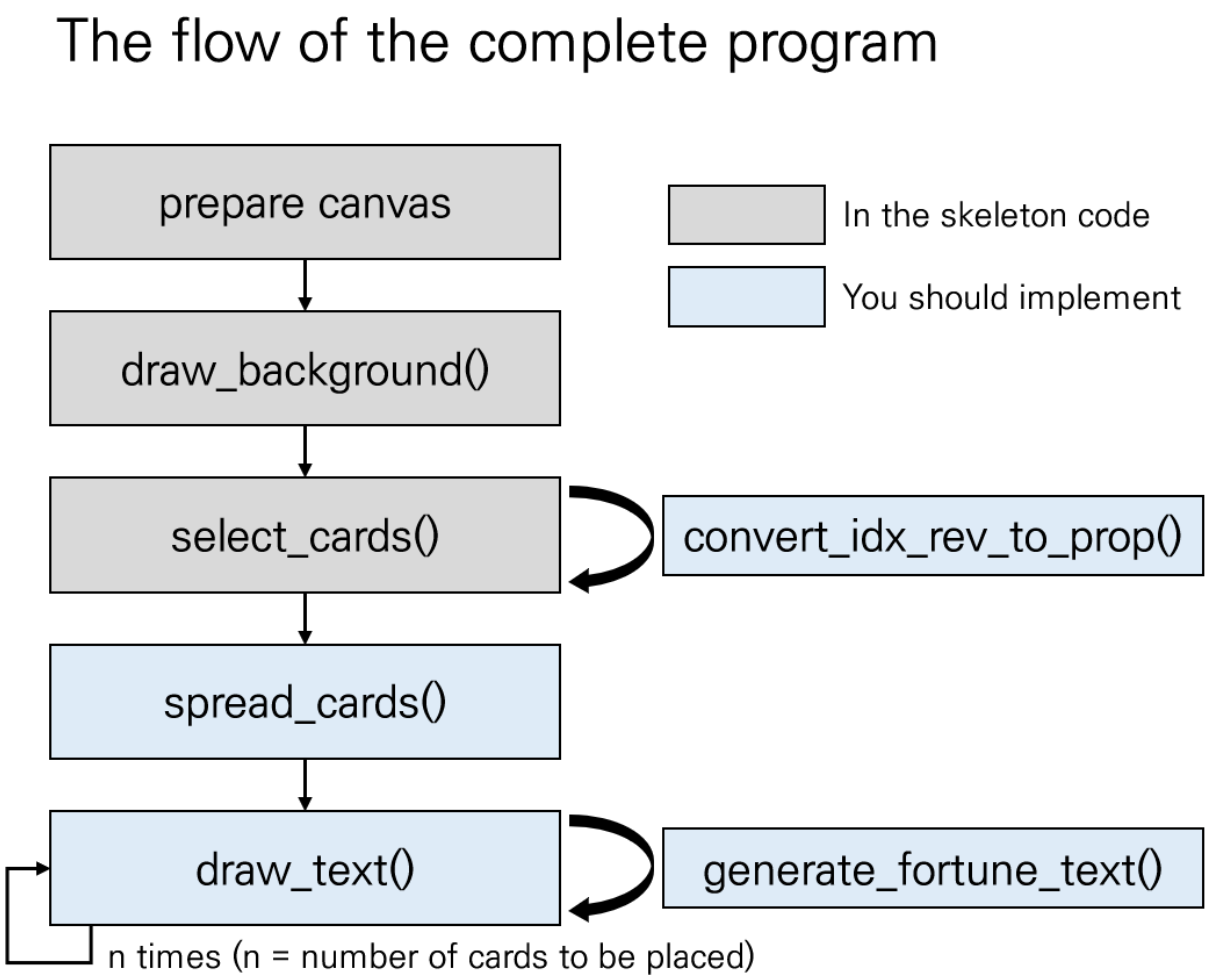
- arcana : 'major' / 'cups' / 'pentacles' / 'swords' / 'wands'
- num : 0~21 for major cards, 1~14 for minor cards
- reversal : if the card is drawn reversed
- Image obj : cs1graphics Image object that contains image of the card

cheat_table : dict of lists of tuples



- string upright : string that represents the interpretation of the card when drawn upright (upstanding)
- string reversal : string that represents the interpretation of the card when drawn reversed (upside down)

4) Program flow chart



Task 1. Draw Tarot card images on canvas (20 pts)

In this task, you should implement two functions: convert_idx_rev_to_prop(index, reversal) and spread_cards(canvas, cards, spread_style).

1) convert_idx_rev_to_prop(index, reversal)

args	index (int): absolute card index 0 ~ 77 reversal (bool): if the card is drawn reversed
return	prop (dict): selected card property

In this function, you should convert the card index and reversal variables into the prop variable. The card index is counted in the order below.

a. Major arcana cards 0~21 onto [0] ~ [21]
b. Minor arcana *Cups* cards 1~14 onto [22] ~ [35]
c. Minor arcana *Pentacles* cards 1~14 onto [36] ~ [49]
d. Minor arcana *Swords* cards 1~14 onto [50] ~ [63]
e. Minor arcana *Wands* cards 1~14 onto [64] ~ [77]

For example, the index [44] card represents Pentacle 9.

Please look carefully at the data structure of dict prop in the Preliminaries – 3) chapter, and fill the key–value pairs in the prop variable.

2) spread_cards(canvas, cards, spread_style)

args	canvas (Canvas): cs1graphics Canvas object that image to be drawn on cards (list of tuples): information on the selected cards spread_style (list of dicts): information on the card spread
return	None

In this function, you should draw selected cards on the canvas, following the spread_style. Please look carefully at the data structure of cards, prop, and spread_style in the Preliminaries – 3) chapter, do the process below for each card, in order (from spread_style[0] to spread_style[len(spread_style)–1]).
(The order MATTERS!! It might affect which card will be placed above!!)

1. Add each card onto the canvas
2. Place and rotate the card at the designated coordinate using *cs1graphics* moveTo() and rotate() function
3. Rotate the card again by 180° if the card had been drawn as a reversal (refer prop variable)

Note. Using the Layer feature is not mandatory in this homework.

Expected result

In this task, random selection in select_cards() is disabled temporarily for easier verification of your code.

Task 2. Generate fortune text (15 pts)

In this task, you should implement a function generate_fortune_text(prop, cheat_table). Beforehand, please copy and paste your implementation of convert_idx_rev_to_prop(index, reversal) from task 1 to this task.

1) generate_fortune_text(prop, cheat_table)

args	prop (dict): selected card property cheat_table (dict of lists of tuples): interpretation texts by the property
return	fortune_text (string): property + interpretation combined text

In this function, you should combine property information and the interpretation of the card by the property into a string. You should follow the rules below.

a. For the Major arcana cards, the string should be combined as
   Major Arcana – {card name}: {interpretation}

b. For the Minor arcana cards, the string should be combined as
   Minor Arcana – {card name} of {arcana}: {interpretation}

card_name is already given in the skeleton code as below. Please keep in mind that there are 14 cards (1~14) for each minor arcana, but the length of the list minor_arcana_names is 15, and it's the same for the cheat_table!! This is just for your convenience, indexing directly with the 'num' value in prop variable.

```
    major_arcana_names = ['The Fool', 'The Magician', 'The High Priestess',
'The Empress', 'The Emperor', 'The Hierophant', 'The Lovers', 'The Chariot',
'Strength', 'The Hermit', 'The Wheel of Fortune', 'Justice', 'The Hanged Man',
'Death', 'Temperance', 'The Devil', 'The Tower', 'The Star', 'The Moon', 'The
Sun', 'Judgement', 'The World']
    minor_arcana_names = ['', 'Ace', 'Two', 'Three', 'Four', 'Five', 'Six',
'Seven', 'Eight', 'Nine', 'Ten', 'Page', 'Knight', 'Queen', 'King']
```

Expected result

```
1. Who am I right now?
Minor Arcana - Ten of cups: waste, broken relationships, quarrel
2. Am I on the right path?
Major Arcana - The High Priestess: knowledge, wisdom, learning, intuition, impatience, virtue, purity
3. What's the main obstacle standing in my way?
Minor Arcana - Seven of swords: betrayal, insolence, unwise attempt
4. What circumstances are in my favor and helping me out?
Minor Arcana - Eight of pentacles: void, no ambition, dislike
5. How can I make progress and move forward in my life?
Minor Arcana - Ace of cups: good health, love, joy, beauty
```

Task 3. Complete fortune teller machine (15 pts)

In this task, you should implement a function draw_text(canvas, text). Beforehand, please copy and paste your implementation of convert_idx_rev_to_prop(index, reversal), spread_cards(canvas, cards, spread_style) from task 1 and generate_fortune_text(prop, cheat_table) from task 2 to this task.

1) draw_text(canvas, text)

args	canvas (Canvas): cs1graphics Canvas object that image to be drawn on text (string): question + fortune_text combined text to be drawn global current_text_written (int): currently written count of text
return	None

In this function, you should draw the text on the black area of the canvas, moving along the y-axis every call. A global variable current_text_written increases by 1 at every end of the function call, so we recommend you use the variable when you move the Text object onto the desired position.

Note that the Text object is already generated, and the reference point of the object is adjusted to (0, 5) in the skeleton code. Therefore, all you have to do is just add in on the canvas, then move onto the designated position using the moveTo() function, then set the font color yellow (255, 255, 0).

The desired position of the Text object on each call is,

1. (600, 65) on the first call
2. (600, 130) on the second call
3. (600, 195) on the third call
4. ...

Expected result