Python i Pygame

Programiranje arkadnih igrica u Pythonu koristeći Pygame

Iznimke (Exceptions)

Što su iznimke?

- Iznimke (Exceptions) su način na koji možemo upravljati pogreškama u programu
- U okviru iznimki se koriste slijedeći nazivi:
  - Exception – označava stanje pogreške pri izvođenju programa, za svako stanje postoji objekt koji sadrži osnovne informacije o stanju
  - Exception handling - dio programa koji odgovara na pogrešku pri izvođenju
  - Except / catch block – za dio koda koji odgovara na pogrešku se kaže da "hvata iznimku" ("catch exception")
  - Throw / raise – kada se desi pogreška pri izvođenju programa kreira se objekt koji se prosljeđuje dijelu koda za upravljanje pogreškama – throw / raise exception
  - Unhandled / uncaught exception – greška koju nije "uhvatio" kod za odgovor na greške – najčešće se nakon toga program "ruši"
  - Try block – dio koda unutar kojeg želimo detektirati grešku

Odgovor na jednu iznimku

- **Primjer 1: Dijeljenje s nulom**

```
try:
    x = 5 / 0
except:
    print("Error dividing by zero")
```

- **Primjer 2: Greška pri pretvaranju**

```
number_entered = False
while not number_entered:
    number_string = input("Enter an integer: ")
    try:
        n = int(number_string)
        number_entered = True
    except:
        print("Error,
```

- **Primjer 3: Otvaranje datoteke**

```
try:
    my_file = open("myfile.txt")
except:
    print("Error opening file")
```

Odgovor na više iznimki

- Primjer: Otvaranje datoteke, čitanje vrijednosti i dijeljenje

```
import sys
# Odgovor na visestruke greske
try:
    my_file = open("myfile.txt")
    my_line = my_file.readline()
    my_int = int(my_line.strip())
    my_calculated_value = 101 / my_int
except IOError:
    # Odgovor na gresku pri otvaranju datoteke
    print("I/O error")
except ValueError:
    # Odgovor na gresku pri konverziji str u int
    print("Could not convert data to an integer.")
except ZeroDivisionError:
    # Odgovor na gresku pri dijeljenju s nulom
    print("Division by zero error")
except:
    # Odgovor na sve ostale greske
    print("Unexpected error:", sys.exc_info()[0])
```

Objekt iznimke

- Objekt iznimke sadrži opis iznimke

```
try:
    x = 5 / 0
except ZeroDivisionError as e:
    print(e)
```

Ispisuje

```
divison by zero
```

Generiranje iznimke

- Iznimke se mogu generirati pomoću raise naredbe
  Primjer:

```
def get_input():
    user_input = input("Enter something: ")
    if len(user_input) == 0:
        raise IOError("User entered nothing")
```

- Poziv funkcije get_input treba staviti unutar rutine za upravljanje greškama:

```
try:
    get_input()
except IOError:
    print("Greska")
```

Primjer: rad sa datotekom

- Za primjer ćemo napisati program koji sprema rezultat igrice u datoteku i iz nje čita spremljenu vrijednost

- Funkcija koja čita spremljenu vrijednost high score

```python
def get_high_score():
    # Postavi varijablu high_score na 0
    high_score = 0
    # Procitaj vrijednost high score iz datoteke
    try:
        high_score_file = open("high_score.txt", "r")
        high_score = int(high_score_file.read())
        high_score_file.close()
        print("The high score is", high_score)
    except IOError:
        # Greska u citanju datoteke, ne postoji datoteka
        print("There is no high score yet.")
    except ValueError:
        # Postoji datoteka, ali ne razumijem procitanu vrijednost
        print("I'm confused. Starting with no high score.")
    # Vrati procitanu vrijednost u glavni program
    return high_score
```

Primjer: rad sa datotekom, nastava

- Funkcija koja sprema novu vrijednost high score

```python
def save_high_score(new_high_score):
    try:
        # Zapisi vrijednost high scoure u datoteku
        high_score_file = open("high_score.txt", "w")

        high_score_file.write(str(new_high_score))
        high_score_file.close()
    except IOError:
        # Ne mogu zapisati
        print("Unable to save the high score.")
```

- Glavni program

```python
# Procitaj spremljeni high score iz datoteke
high_score = get_high_score()
# Postavi current score na 0
current_score = 0
try:
    # Pitaj igraca za njegou current score
    current_score = int(input("What is your score? "))
except ValueError:
    # Greska, ne mogu pretvoriti unesenu vrijednost u broj
    print("I don't understand what you typed.")
# Provjeri da li imamo novi high score
if current_score > high_score:
    # Imamo! Spremi vrijednost u datoteku
    print("Yea! New high score!")
    save_high_score(current_score)
else:
    print("Better luck next time.")
```

Kviz

- Slijedi link ispod:

  http://programarcadegames.com/quiz/quiz.php?file=exceptions&lang=en

Kviz odgovori

- P1: What is an exception?
  - Paramore thinks you are the only one.
  - Something that results in abnormal program flow.
  - An if statement that is False.
  - Code that handles an unexpected condition in the program.

- P2: What is a catch or exception block?
  - Something computers play in the back yard.
  - Code that handles an unexpected condition in the program.
  - Code that may cause an error that needs to be handled.
  - A block with 22 lines in it.

Kviz odgovori, nastavak

- **P3: What is a try block?**
  - There is no try block, only do or not do blocks.
  - Code that may cause an error that needs to be handled.
  - Something that results in abnormal program flow.
  - An if statement that is False.
  - Code that handles an unexpected condition in the program.

- **P4: What will print for x?**
```
try:
    x = 5/0
    y = 10
except:
    print("Error")
print(x)
```
  - Infinity
  - 5/0
  - x will not print, there is an error.
  - 0 because the error has been caught.
  - 5

Kviz odgovori, nastavak

- ## P5: What does the keyword raise do?
    - Generates a new exception that will be handled by an except block.
    - Checks for errors.
    - Brings code back to life after it has been executed.
    - Generates a new exception that will be handled by an try block.

- ## P6: What will print for y?
    ```
    try:
        x = 5/0
        y = 10
    except:
        print("Error")
    print(y)
    ```
    - Infinity
    - 10 because the error has been caught.
    - y will not print, there is an error.
    - 5
    - 10

Kviz odgovori, nastavak

- P7: What is e?

```
try:
    x = 5 / 0
except ZeroDivisionError as e:
    print(e)
```

  - 5
  - A class that stores data about the error.
  - A library for exception handling.
  - An object that stores data about the error.
  - 0