Chapter 4: snakes and ladders

Description: Make a GUI(graphic user interface) to play snakes and ladders with friends

Why?: The creation of GUIs will apply to several things you will need in the future. It’s how the user easily uses your stuff. You should learn the basics of how to do that. Although this is in python and you will likely never use this language, the structure and way things are connected are a good thing to learn.

Resources:

- Python 3
- Github

Todo:

- Make a button to roll dice
- Enter the number of players
- win/lose cases
- Add snakes and ladders

Code:

```
import tkinter as tk
r = tk.Tk()
r.title('Counting Seconds')
button = tk.Button(r, text='Stop', width=25, command=r.destroy)
button.pack()
r.mainloop()



snakes = {5:1, 20:9, 24:17, 45:21, 33:11}
ladders = {8:13, 16:38, 19:22, 25:27, 35:45}

def game():
    # show gui
    # put in number of players
    players = {}
    players[inputName] = 0
    while True:

    # show position on board
    # roll dice, random number generator
    # if position in snakes or ladder update positions
    # if 50 position
    # if not perfect roll go back
    print()

game()
```

* tkinter makes gui's (Graphic user interface)
* 2 maps to show where you will end up if you roll there

```
Import tkinter package
Initiate window
Create a title for window
Add a button called stop which will destroy window
Add button to window

Define game function
        Create map for players
```

Step 2:

```
#!/usr/bin/env python
import tkinter as tk
from tkinter import *
import random

snakes = {5:1, 20:9, 24:17, 45:21, 33:11}
ladders = {8:13, 16:38, 19:22, 25:27, 35:45}

class windowclass():
        def __init__(self,master):
                self.master = master
                self.frame = tk.Frame(master,padx=20, pady=50)
                self.lbl = Label(master , text = "Enter number of Players")
                self.lbl.pack()
                self.numPlay = Entry(master, width=30)
                self.numPlay.pack()
                self.btn = Button(master , text = "Start Game" , command = self.command
)

                self.btn.pack()
                self.frame.pack(expand=True)


        def command(self):
```

```
        self.newWindow = tk.Toplevel(self.master)
        self.app = EnterNames(self.newWindow,self.numPlay.get())

class EnterNames():
    def __init__(self , master, num):
        self.num = num
        self.master = master
        self.frame = tk.Frame(master)
        master.title("Enter Names")
        self.enterButton = tk.Button(self.frame, text = 'Enter Usernames', width = 25 , command = self.command)
        self.enterButton.pack()
        self.frame.pack()

    def command(self):
        self.newWindow = tk.Toplevel(self.master)
        self.app = Main(self.newWindow,self.num)

class Main():
    def __init__(self , master, num):
        self.master = master
        self.frame = tk.Frame(master)
        master.title("Snakes and Ladders")
        # Users turn to spin and display position on board

        self.spinButton = tk.Button(self.frame, text = 'Spin', width = 25, command = self.spin)
        self.spinButton.pack()

        self.quitButton = tk.Button(self.frame, text = 'Quit', width = 25 , command = self.close_window)
        self.quitButton.pack()
        self.frame.pack()

    def spin(self):
        print("Number shown")
        random.randint(1, 12)

    def close_window(self):
        self.master.destroy()
        sys.exit()
```

```
if __name__ == '__main__':
        root = Tk()

        root.title("window")

        root.geometry("350x100")

        cls = windowclass(root)

        root.mainloop()
```

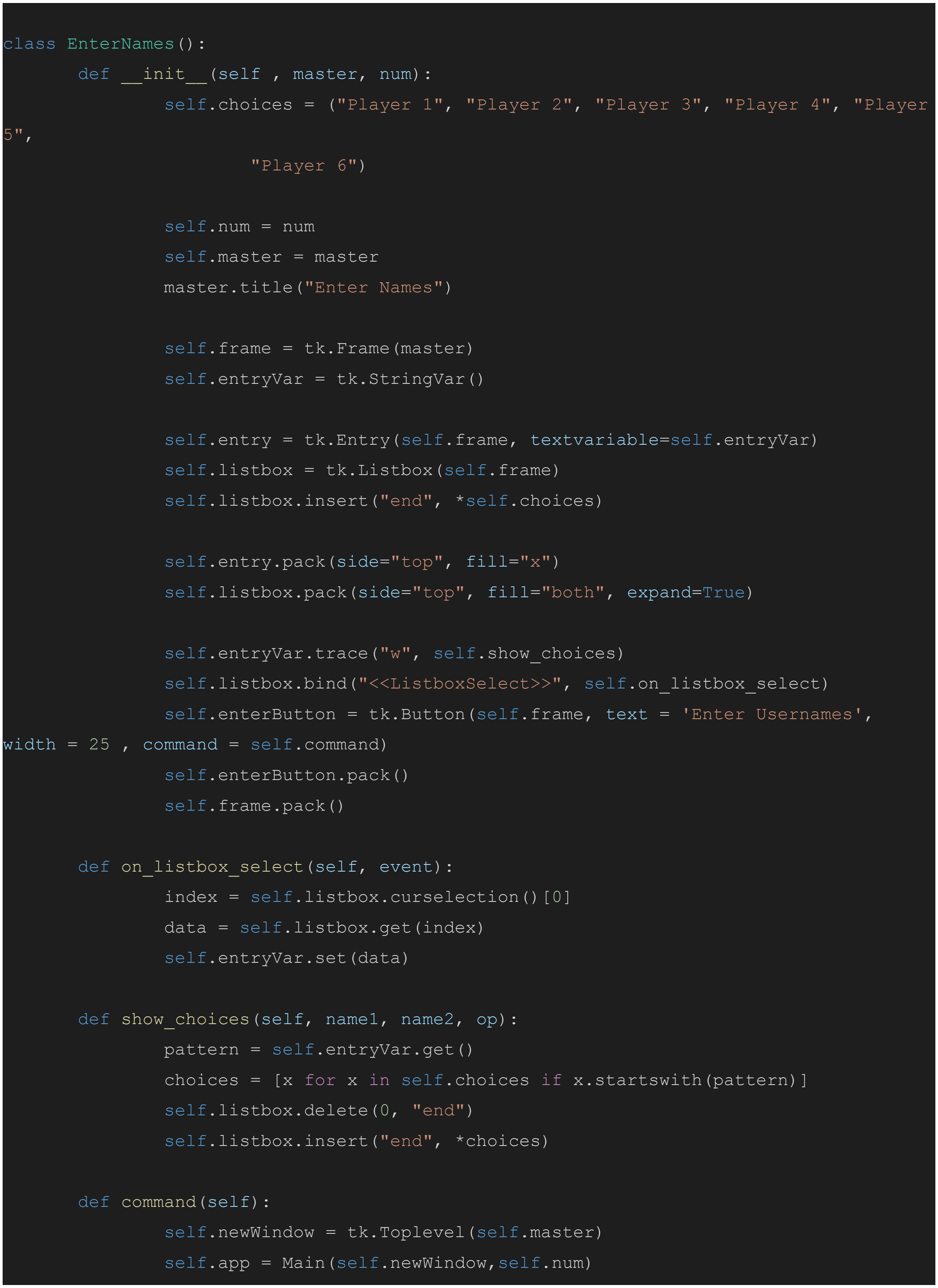
* A class is a group of functions for one purpose
* Each class is need to contain an instance of the window, it’s just easier to look at it this way

```
Import tkinter package
Import random for rolling dice

Create two dictionaries to hold position and new position
Create a class called window class (Initial window)
    Initialize function(start)
        Subwindow made
        Make a frame with a label saying “Enter number of players”
        Add an entry and attach to window
        Add a button that send to command function

    Define command function
        Create a new window
        Create new window for entering names
        Pass window and number of players to EnterNames object

Create a class  EnterNames (Window for adding usernames)
        Initialize function(start) parameter of num
            Set num, master, to passed parameter values
            Create a frame for window and set title to “Enter names”
            Add a enter button connected to command function
        Define command function
            Create a another layer of window and pass that to new main object

Create a class called main
    Initiate function
        Set num and master to parameter values
        Set title of frame to “Snakes and Ladders”
        Add spin button and quitButton
    Define a spin function
```

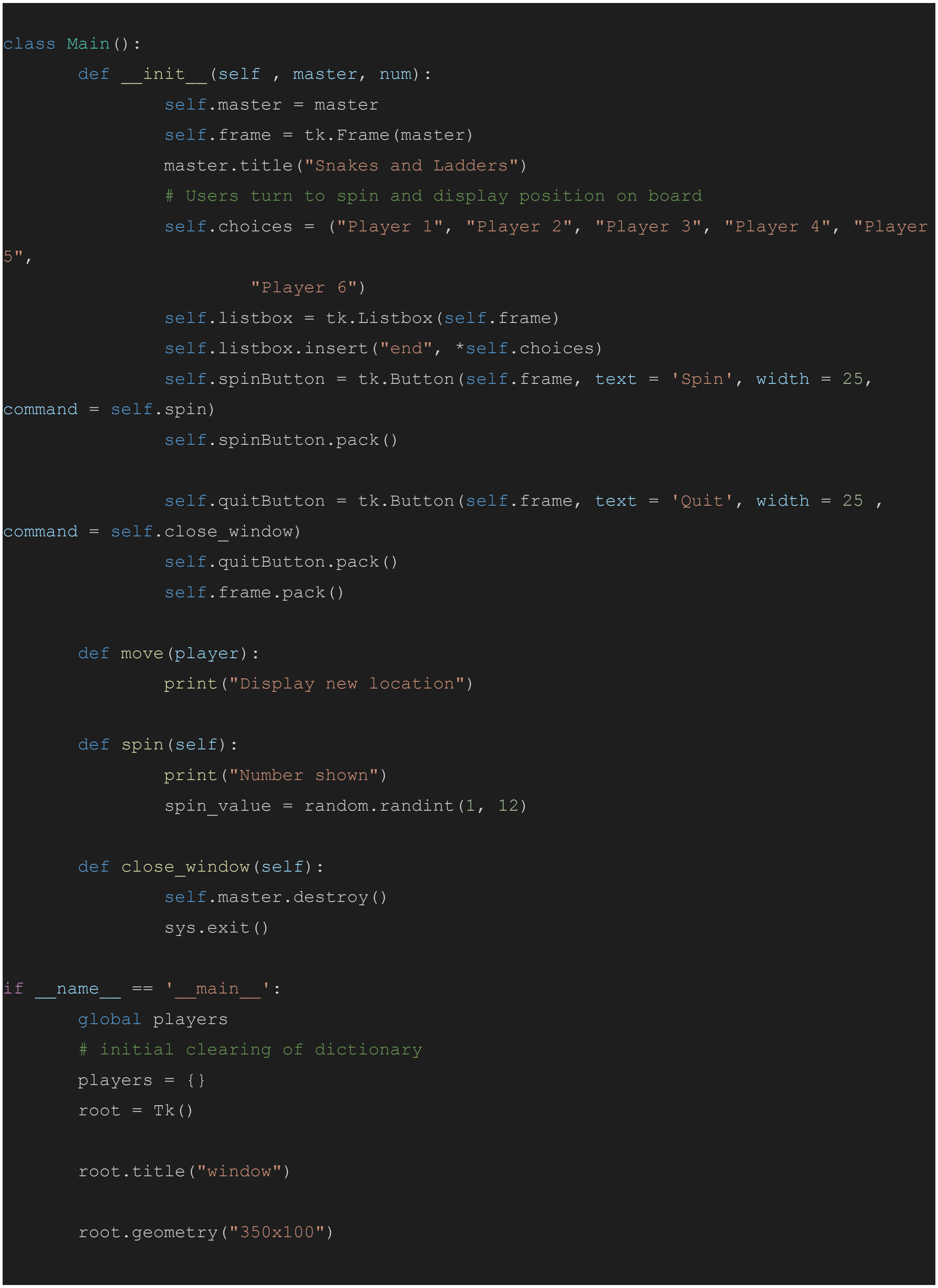
```
                Pick a random number from 1-12
        Define a close_window
                End program

When main is called for this script
        Initiate tkinter and create a main window
        Start our game from windowclass
```

Step 3:

```
#!/usr/bin/env python
import tkinter as tk
from tkinter import *
import random

snakes = {5:1, 20:9, 24:17, 45:21, 33:11}
ladders = {8:13, 16:38, 19:22, 25:27, 35:45}

players = {}
class Player():
        def __init__(self):
                self.pos = 0
                self.name = ""

class windowclass():
        def __init__(self,master):
                self.master = master
                self.frame = tk.Frame(master,padx=20, pady=50)
                self.lbl = Label(master , text = "Enter number of Players")
                self.lbl.pack()
                self.numPlay = Entry(master, width=30)
                self.numPlay.pack()
                self.btn = Button(master , text = "Start Game" , command = self.command
)

                self.btn.pack()
                self.frame.pack(expand=True)

        def command(self):
                global players
                self.newWindow = tk.Toplevel(self.master)
                self.app = EnterNames(self.newWindow,self.numPlay.get())
                # set players
                for i in range(self.numPlay.get()):
                        players[i] = Player()
```



```
class EnterNames():
        def __init__(self , master, num):
                self.choices = ("Player 1", "Player 2", "Player 3", "Player 4", "Player
5",
                        "Player 6")

                self.num = num
                self.master = master
                master.title("Enter Names")

                self.frame = tk.Frame(master)
                self.entryVar = tk.StringVar()

                self.entry = tk.Entry(self.frame, textvariable=self.entryVar)
                self.listbox = tk.Listbox(self.frame)
                self.listbox.insert("end", *self.choices)

                self.entry.pack(side="top", fill="x")
                self.listbox.pack(side="top", fill="both", expand=True)

                self.entryVar.trace("w", self.show_choices)
                self.listbox.bind("<<ListboxSelect>>", self.on_listbox_select)
                self.enterButton = tk.Button(self.frame, text = 'Enter Usernames',
width = 25 , command = self.command)
                self.enterButton.pack()
                self.frame.pack()

        def on_listbox_select(self, event):
                index = self.listbox.curselection()[0]
                data = self.listbox.get(index)
                self.entryVar.set(data)

        def show_choices(self, name1, name2, op):
                pattern = self.entryVar.get()
                choices = [x for x in self.choices if x.startswith(pattern)]
                self.listbox.delete(0, "end")
                self.listbox.insert("end", *choices)

        def command(self):
                self.newWindow = tk.Toplevel(self.master)
                self.app = Main(self.newWindow,self.num)
```



```
class Main():
       def __init__(self , master, num):
               self.master = master
               self.frame = tk.Frame(master)
               master.title("Snakes and Ladders")
               # Users turn to spin and display position on board
               self.choices = ("Player 1", "Player 2", "Player 3", "Player 4", "Player
5",
                       "Player 6")
               self.listbox = tk.Listbox(self.frame)
               self.listbox.insert("end", *self.choices)
               self.spinButton = tk.Button(self.frame, text = 'Spin', width = 25,
command = self.spin)
               self.spinButton.pack()

               self.quitButton = tk.Button(self.frame, text = 'Quit', width = 25 ,
command = self.close_window)
               self.quitButton.pack()
               self.frame.pack()

       def move(player):
               print("Display new location")

       def spin(self):
               print("Number shown")
               spin_value = random.randint(1, 12)

       def close_window(self):
               self.master.destroy()
               sys.exit()

if __name__ == '__main__':
       global players
       # initial clearing of dictionary
       players = {}
       root = Tk()

       root.title("window")

       root.geometry("350x100")
```

```
        cls = windowclass(root)


        root.mainloop()
```

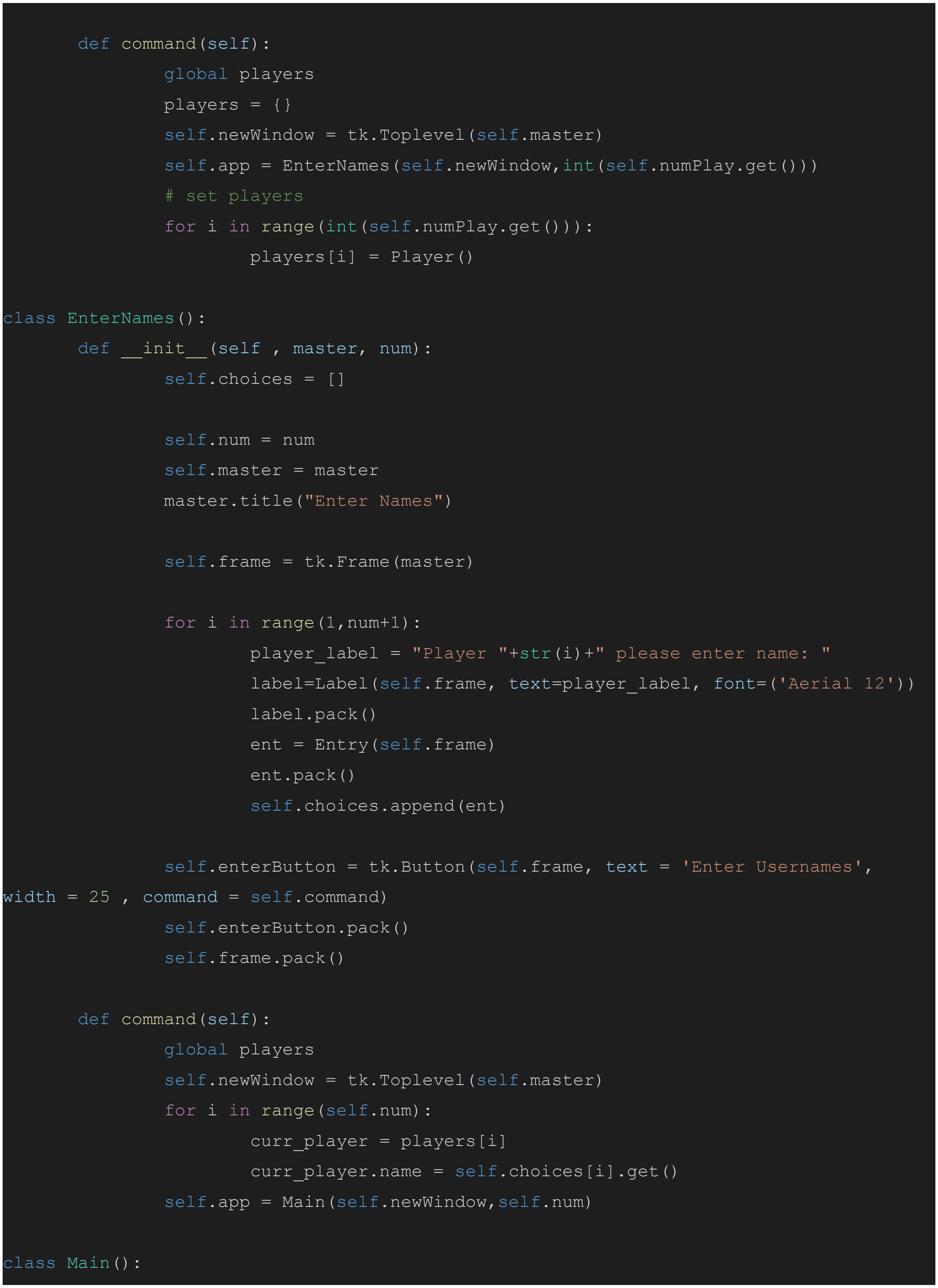
* Circle brackets mean tuple, this means the values can’t be changed

* Making objects for complicated information is useful for when you have a list of values that need to have a bunch of data

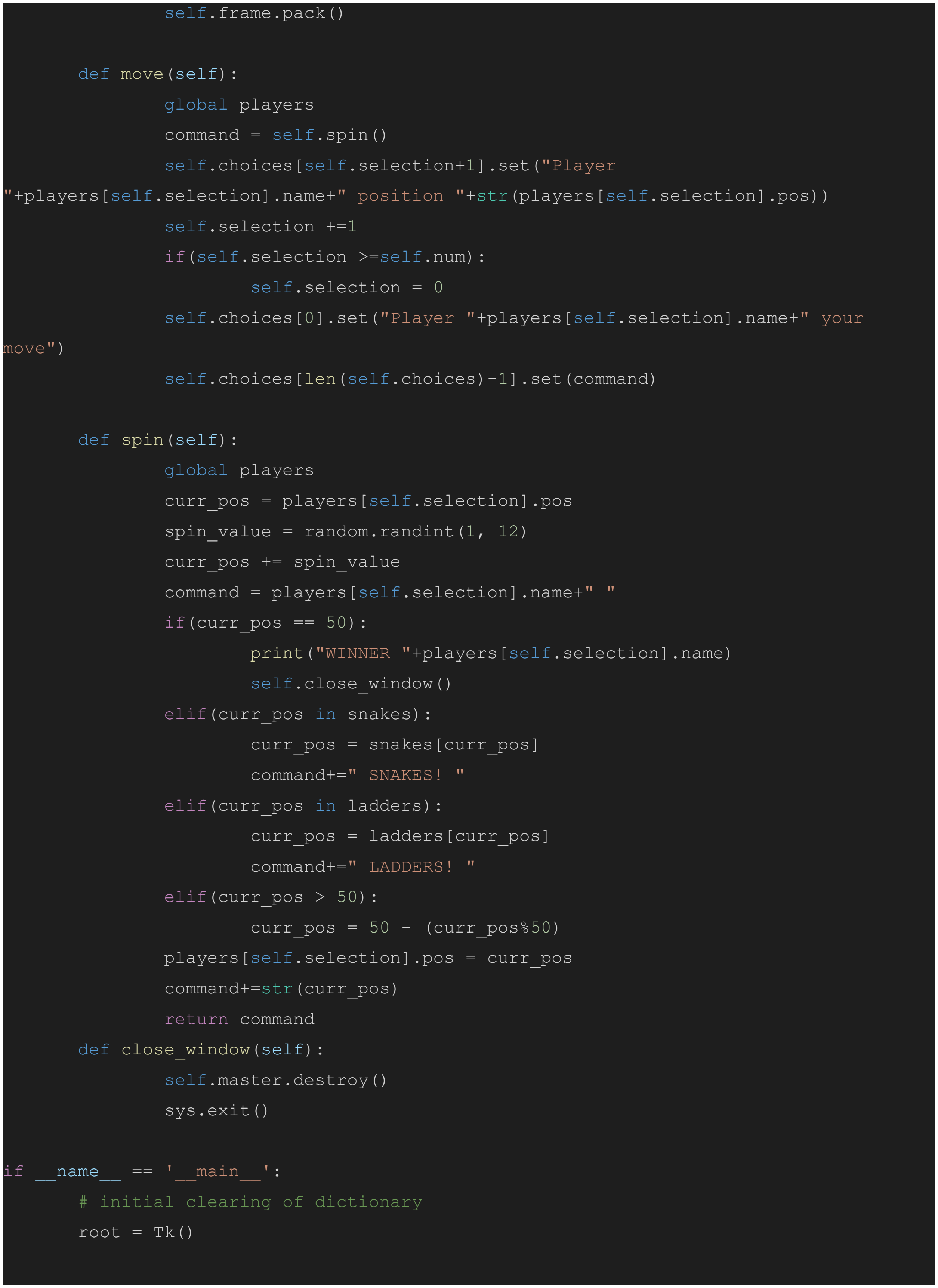
```
Import tkinter package
Import random for rolling dice

Create two dictionaries to hold position and new position
Create a players dictionary
Create a players function that will contain all player information (For easy retrieval)
Create a class called window class (Initial window)
    Initialize function(start)
        Subwindow made
        Make a frame with a label saying “Enter number of players”
        Add an entry and attach to window
        Add a button that send to command function

    Define command function
        Create a new window
        Create new window for entering names
        Pass window and number of players to EnterNames object
        Create empty players and add them to our global players dictionary

Create a class  EnterNames (Window for adding usernames)
        Initialize function(start) parameter of num
            Create a tuple of max player titles
            Set num, master, to passed parameter values
            Create a frame for window and set title to “Enter names”
            Create a listbox that will contain all users that can have a name added

            Add a enter button connected to command function
        Define function to show_choices (This was only for testing not in final result)
            Shows all things in a list
        Define command function
            Create a another layer of window and pass that to new main object

Create a class called main
    Initiate function
        Set num and master to parameter values
        Set title of frame to “Snakes and Ladders”
        We create a list of values to substitute for our users
        Add spin button and quitButton
    Define a move function
        Will be used to show our user the move that just happened
    Define a spin function
        Pick a random number from 1-12
    Define a close_window
        End program

When main is called for this script
    Initiate tkinter and create a main window
    Start our game from windowclass
```

Code 4:

```
#!/usr/bin/env python
import tkinter as tk
from tkinter import *
import random

snakes = {5:1, 20:9, 24:17, 45:21, 33:11}
ladders = {8:13, 16:38, 19:22, 25:27, 35:45}

players = {}

class Player():
        def __init__(self):
                self.pos = 0
                self.name = ""

class windowclass():
        def __init__(self,master):
                self.master = master
                self.frame = tk.Frame(master,padx=20, pady=50)
                self.lbl = Label(master , text = "Enter number of Players")
                self.lbl.pack()
                self.numPlay = Entry(master, width=30)
                self.numPlay.pack()
                self.btn = Button(master , text = "Start Game" , command = self.command
)

                self.btn.pack()
                self.frame.pack(expand=True)
```



```
    def command(self):
        global players
        players = {}
        self.newWindow = tk.Toplevel(self.master)
        self.app = EnterNames(self.newWindow,int(self.numPlay.get()))
        # set players
        for i in range(int(self.numPlay.get())):
            players[i] = Player()

class EnterNames():
    def __init__(self , master, num):
        self.choices = []

        self.num = num
        self.master = master
        master.title("Enter Names")

        self.frame = tk.Frame(master)

        for i in range(1,num+1):
            player_label = "Player "+str(i)+" please enter name: "
            label=Label(self.frame, text=player_label, font=('Aerial 12'))
            label.pack()
            ent = Entry(self.frame)
            ent.pack()
            self.choices.append(ent)

        self.enterButton = tk.Button(self.frame, text = 'Enter Usernames',
width = 25 , command = self.command)
        self.enterButton.pack()
        self.frame.pack()

    def command(self):
        global players
        self.newWindow = tk.Toplevel(self.master)
        for i in range(self.num):
            curr_player = players[i]
            curr_player.name = self.choices[i].get()
        self.app = Main(self.newWindow,self.num)

class Main():
    def __init__(self , master, num):
        global players
        self.num = num
        self.master = master
        self.frame = tk.Frame(master)
        self.choices = []
        master.title("Snakes and Ladders")

        # Users turn to spin and display position on board
        text = tk.StringVar()
        player_label = "Player "+players[0].name+" your move"
        text.set(player_label)
        label=Label(self.frame, textvariable=text, font=('Aerial 18 
underline'))
        label.pack()
        self.choices.append(text)

        for i in range(num):
            text = tk.StringVar()
            player_label = "Player "+players[i].name+" position 
"+str(players[i].pos)
            text.set(player_label)
            label=Label(self.frame, textvariable=text, font=('Aerial 12'))
            label.pack()
            self.choices.append(text)

        text = tk.StringVar()
        player_label = "Last Move"
        text.set(player_label)
        label=Label(self.frame, textvariable=text, font=('Aerial 18 
underline'))
        label.pack()
        self.choices.append(text)

        self.selection = 0
        self.spinButton = tk.Button(self.frame, text = 'Spin', width = 25, 
command = self.move)
        self.spinButton.pack()

        self.quitButton = tk.Button(self.frame, text = 'Quit', width = 25 , 
command = self.close_window)
        self.quitButton.pack()
```



```
                self.frame.pack()

        def move(self):
                global players
                command = self.spin()
                self.choices[self.selection+1].set("Player "+players[self.selection].name+" position "+str(players[self.selection].pos))
                self.selection +=1
                if(self.selection >=self.num):
                        self.selection = 0
                self.choices[0].set("Player "+players[self.selection].name+" your move")
                self.choices[len(self.choices)-1].set(command)

        def spin(self):
                global players
                curr_pos = players[self.selection].pos
                spin_value = random.randint(1, 12)
                curr_pos += spin_value
                command = players[self.selection].name+" "
                if(curr_pos == 50):
                        print("WINNER "+players[self.selection].name)
                        self.close_window()
                elif(curr_pos in snakes):
                        curr_pos = snakes[curr_pos]
                        command+=" SNAKES! "
                elif(curr_pos in ladders):
                        curr_pos = ladders[curr_pos]
                        command+=" LADDERS! "
                elif(curr_pos > 50):
                        curr_pos = 50 - (curr_pos%50)
                players[self.selection].pos = curr_pos
                command+=str(curr_pos)
                return command
        def close_window(self):
                self.master.destroy()
                sys.exit()

if __name__ == '__main__':
        # initial clearing of dictionary
        root = Tk()
        root.title("window")


        root.geometry("350x100")


        cls = windowclass(root)


        root.mainloop()
```

```
Import tkinter package
Import random for rolling dice

Create two dictionaries to hold position and new position
Create a players dictionary
Create a players function that will contain all player information (For easy retrieval)
Create a class called window class (Initial window)
    Initialize function(start)
        Subwindow made
        Make a frame with a label saying “Enter number of players”
        Add an entry and attach to window
        Add a button that send to command function

    Define command function
        Create a new window
        Create new window for entering names
        Pass window and number of players to EnterNames object
        Create empty players and add them to our global players dictionary

Create a class  EnterNames (Window for adding usernames)
        Initialize function(start) parameter of num
            Set num, master, to passed parameter values
            Create a frame for window and set title to “Enter names”
            Create empty list called choices
            For each number of users
                Create a label and entry to enter username
                Append values to a list called choices
            Add a enter button connected to command function
        Define function to show_choices (This was only for testing not in final result)
            Shows all things in a list
        Define command function
            Create a another layer of window and pass that to new main object
            For each player
                Add player names to players dictionary

Create a class called main
```

```
    Initiate function
        Set num and master to parameter values
        Set title of frame to “Snakes and Ladders”
        Create a text string on our window
        Set a label to that text
        For each user print username and position
        Create text for last move
        Set label with last move text
        Create a variable selection set to 0 (Current user)
        Add spin button and quitButton
    Define a move function
        Execute spin function
        Update the current user position and position label
        Update selection variable for next player or rollback to first player
        First value in choices is the first label for showing which user moves next
    Define a spin function
        Pick a random number from 1-12
        Get current position of user
        Add spin to position
        Update last move string (Show what just happened)
        If you hit 50 then you won. Close program
        Else if position in snakes
            Then update position and add to last move string
        Else if position in ladders
            Then update position and add to last move string
        Else if position is greater than 50 then we have move backwards
    Define a close_window
        End program

When main is called for this script
    Initiate tkinter and create a main window
    Start our game from windowclass
```

Extra:

For extra stuff look here:

https://github.com/DownRamp/Games/blob/master/snakes_ladders.py

****

THIS IS THE IMPORTANT PART PLEASE DON’T SKIP

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Next steps:

- Better GUI
- Make the game longer
- Seperate classes and put in different files
- Add different action (Like elevator or something)