**Problem 1:**

**Part A:**

# Prompt the user for their guess  
**def prompt\_guess**():  
 **return** 55  
  
  
# Check the user's guess against the game's number  
# -1 is too low  
# 0 is the correct number  
# 1 is too high  
**def check\_guess**(guess, correct\_num):  
 **return** 1  
  
  
# Prompt the user for a guess and loop until their guess is correct  
# Returns number of how many guesses the user needed  
**def loop\_guesses**(correct\_num):  
 **return** 5  
  
  
# Generate the random number for the game to use  
**def generate\_num**():  
 **return** 67  
  
  
# Calculate the user's winnings based on their number of guesses  
**def calc\_winnings**(guess\_count):  
 **return** 3  
  
  
# Display the user's winnings for the round, along with their total winnings  
**def show\_winnings**(win\_round, win\_total):  
 **return**# Prompts the user to ask them if they want to go to the next round  
**def prompt\_repeat**():  
 **return** True  
  
  
# Loop through each of the game rounds, stopping when the user decides to exit  
**def loop\_rounds**():  
 **return**

**Part B:**

**import** random  
  
# Prompt the user for their guess  
**def prompt\_guess**():  
 num\_raw = raw\_input("Can you guess what number I'm thinking of? ")  
  
 **return** int(num\_raw)  
  
  
# Check the user's guess against the game's number  
# -1 is too low  
# 0 is the correct number  
# 1 is too high  
**def check\_guess**(guess, correct\_num):  
 **if** guess == correct\_num:  
 **return** 0  
 **elif** guess < correct\_num:  
 **return** -1  
 **elif** guess > correct\_num:  
 **return** 1  
  
  
# Prompt the user for a guess and loop until their guess is correct  
# Returns number of how many guesses the user needed  
**def loop\_guesses**(correct\_num):  
 guess = -1  
 guess\_count = 0  
  
 **while** guess != correct\_num:  
 guess = prompt\_guess()  
 guess\_count += 1  
  
 guess\_status = check\_guess(guess, correct\_num)  
  
 **if** guess\_status == 0:  
 **print** "Your guess was correct!"  
 **print** "You guessed the number in", guess\_count, "guesses!"  
  
 **return** guess\_count  
  
 **elif** guess\_status == -1:  
 **print** "Your guess was too low. Try again!"  
 **else**:  
 **print** "Your guess was too high. Try again!"  
  
 **if** guess\_count == 7:  
 **print** "You're out of guesses!"  
 **print** "The number I was thinking of was " + str(correct\_num) + "!"  
 **return** 8  
  
 **print**

# Generate the random number for the game to use  
**def generate\_num**():  
 random.seed()  
 num = random.randint(1, 100)  
  
 **return** num  
  
  
# Calculate the user's winnings based on their number of guesses  
**def calc\_winnings**(guess\_count):  
 **if** guess\_count == 8:  
 **return** -10  
 **if** guess\_count == 7:  
 **return** 0  
  
 **return** 8 - guess\_count  
  
  
# Display the user's winnings for the round, along with their total winnings  
**def show\_winnings**(win\_round, win\_total):  
 **if** win\_round >= 0:  
 **print** "You won $" + str(win\_round) + " this round"  
 **else**:  
 **print** "You have lost $" + str(abs(win\_round)) + " this round"  
  
 **if** win\_total > 0:  
 **print** "You have $" + str(win\_total) + " so far"  
 **else**:  
 **print** "You have -$" + str(abs(win\_total)) + " so far"  
  
 **print**# Prompts the user to ask them if they want to go to the next round  
**def prompt\_repeat**():  
 prompt = raw\_input("Would you like to play another round (y/n)? ")  
  
 prompt = prompt.lower()  
  
 **if** prompt == 'y' **or** prompt == 'yes':  
 **return** True  
 **elif** prompt == 'n' **or** prompt == 'no':  
 **return** False  
 **else**:  
 "I'm sorry, I don't know what you're saying."  
 **print  
 return** prompt\_repeat()  
  
  
# Loop through each of the game rounds, stopping when the user decides to exit  
**def loop\_rounds**():  
 playing = True  
 game\_winnings = 0  
  
 **while** playing:  
 **print** "I am thinking of a number between 1 and 100."  
  
 num = generate\_num()  
  
 guesses = loop\_guesses(num)  
 round\_winnings = calc\_winnings(guesses)  
 game\_winnings += round\_winnings  
  
 show\_winnings(round\_winnings, game\_winnings)  
  
 playing = prompt\_repeat()  
  
loop\_rounds()

I am thinking of a number between 1 and 100.

Can you guess what number I'm thinking of? 50

Your guess was too low. Try again!

Can you guess what number I'm thinking of? 75

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 62

Your guess was correct!

You guessed the number in 3 guesses!

You won $5 this round

You have $5 so far

Would you like to play another round (y/n)? y

I am thinking of a number between 1 and 100.

Can you guess what number I'm thinking of? 50

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 51

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 52

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 53

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 54

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 5

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 1

Your guess was too low. Try again!

You're out of guesses!

The number I was thinking of was 3!

You have lost $10 this round

You have -$5 so far

Would you like to play another round (y/n)? n

**Part B Extra Credit:**

**import** random  
  
correct\_num = -1  
guess = -1  
guess\_count = 0  
  
win\_round = 0  
win\_total = 0  
  
# Prompt the user for their guess  
**def prompt\_guess**():  
 **global** guess  
  
 num\_raw = raw\_input("Can you guess what number I'm thinking of? ")  
  
 guess = int(num\_raw)  
  
  
# Check the user's guess against the game's number  
# -1 is too low  
# 0 is the correct number  
# 1 is too high  
**def check\_guess**():  
 **if** guess == correct\_num:  
 **return** 0  
 **elif** guess < correct\_num:  
 **return** -1  
 **elif** guess > correct\_num:  
 **return** 1  
  
  
# Prompt the user for a guess and loop until their guess is correct  
# Returns number of how many guesses the user needed  
**def loop\_guesses**():  
 **global** guess  
 **global** guess\_count  
  
 guess = -1  
 guess\_count = 0  
  
 **while** guess != correct\_num:  
 prompt\_guess()  
 guess\_count += 1  
  
 guess\_status = check\_guess()  
  
 **if** guess\_status == 0:  
 **print** "Your guess was correct!"  
 **print** "You guessed the number in", guess\_count, "guesses!"  
  
 **return  
  
 elif** guess\_status == -1:  
 **print** "Your guess was too low. Try again!"  
 **else**:  
 **print** "Your guess was too high. Try again!"  
  
 **if** guess\_count == 7:  
 **print** "You're out of guesses!"  
 **print** "The number I was thinking of was " + str(correct\_num) + "!"  
 **return** 8  
  
 **print**# Generate the random number for the game to use  
**def generate\_num**():  
 **global** correct\_num  
  
 random.seed()  
 correct\_num = random.randint(1, 100)  
  
  
# Calculate the user's winnings based on their number of guesses  
**def calc\_winnings**():  
 **global** win\_round  
  
 **if** guess\_count == 8:  
 **return** -10  
 **if** guess\_count == 7:  
 **return** 0  
  
 win\_round = 8 - guess\_count  
  
  
# Display the user's winnings for the round, along with their total winnings  
**def show\_winnings**():  
 **if** win\_round >= 0:  
 **print** "You won $" + str(win\_round) + " this round"  
 **else**:  
 **print** "You have lost $" + str(abs(win\_round)) + " this round"  
  
 **if** win\_total > 0:  
 **print** "You have $" + str(win\_total) + " so far"  
 **else**:  
 **print** "You have -$" + str(abs(win\_total)) + " so far"  
  
 **print**# Prompts the user to ask them if they want to go to the next round  
**def prompt\_repeat**():  
 prompt = raw\_input("Would you like to play another round (y/n)? ")  
  
 prompt = prompt.lower()  
  
 **if** prompt == 'y' **or** prompt == 'yes':  
 **return** True  
 **elif** prompt == 'n' **or** prompt == 'no':  
 **return** False  
 **else**:  
 "I'm sorry, I don't know what you're saying."  
 **print  
 return** prompt\_repeat()  
  
  
# Loop through each of the game rounds, stopping when the user decides to exit  
**def loop\_rounds**():  
 **global** guess\_count  
 **global** win\_round  
 **global** win\_total  
  
 playing = True  
 win\_total = 0  
  
 **while** playing:  
 **print** "I am thinking of a number between 1 and 100."  
  
 generate\_num()  
  
 guess\_count = loop\_guesses()  
 win\_round = calc\_winnings()  
 win\_total += win\_round  
  
 show\_winnings()  
  
 playing = prompt\_repeat()  
  
loop\_rounds()

**Problem 2:**

**Part A:**

# Generates a random number between 1 and 100,000  
**def gen\_number**():  
 **return** 15656  
  
  
# Finds the number of guesses allowed for the given range  
**def get\_guess\_count**(range):  
 **return** 17  
  
  
# Finds the penalty for failing to guess within the limit  
**def get\_penalty**(guess\_max):  
 **return** 24  
  
  
# Finds the reward for a certain number of guesses given the guess limit  
**def get\_reward**(guess\_max, guess\_count):  
 **return** 15  
  
  
# Displays the number range and betting rules to the user  
**def show\_rules**(range, guess\_max):  
 **return**

**Part B:**

**import** random  
  
  
# Generates a random number between 1 and 100,000  
**def generate\_num**():  
 random.seed()  
 num = random.randint(1, 100000)  
  
 **return** num  
  
  
# Finds the number of guesses allowed for the given range  
**def get\_range**(num):  
 **if** num < 101:  
 **return** (1, 100)  
 **if** num < 1001:  
 **return** (101, 1000)  
 **if** num < 15001:  
 **return** (1001, 15000)  
 **else**:  
 **return** (15001, 100000)

# Finds the number of guesses allowed for the given range  
**def get\_guess\_count**(range\_num):  
 **if** range\_num[0] == 1:  
 **return** 7  
 **if** range\_num[0] == 101:  
 **return** 10  
 **if** range\_num[0] == 1001:  
 **return** 14  
 **if** range\_num[0] == 15001:  
 **return** 17  
  
  
# Finds the penalty for failing to guess within the limit  
**def get\_penalty**(guess\_max):  
 **return** -2 \* guess\_max  
  
  
# Finds the reward for a certain number of guesses given the guess limit  
**def get\_reward**(guess\_max, guess\_count):  
 **if** guess\_count == guess\_max + 1:  
 **return** get\_penalty(guess\_max)  
 **if** guess\_count == guess\_max:  
 **return** 0  
  
 **return** guess\_max - guess\_count + 1  
  
  
# Displays the number range and betting rules to the user  
**def show\_rules**(range\_num, guess\_max, win\_total):  
 **print** "I am thinking of a number between", range\_num[0], "and", range\_num[1]  
  
 **print** "You have", guess\_max, "guesses allowed."  
 **print** "You have $" + str(win\_total) + " right now."  
 **print** "If you take too many guesses, you will lose $" + \  
 str(abs(get\_penalty(guess\_max))) + "."  
 **print** "If you take fewer than that, you will receive a reward:"  
 **for** i **in** range(1, 4):  
 **print** str(i) + " $" + str(get\_reward(guess\_max, i))  
  
 **print** "..."  
 **print** str(guess\_max - 1) + " $2"  
 **print** str(guess\_max) + " $0"  
  
  
# Prompt the user for their guess  
**def prompt\_guess**():  
 num\_raw = raw\_input("Can you guess what number I'm thinking of? ")  
  
 **return** int(num\_raw)

# Check the user's guess against the game's number  
# -1 is too low  
# 0 is the correct number  
# 1 is too high  
**def check\_guess**(guess, correct\_num):  
 **if** guess == correct\_num:  
 **return** 0  
 **elif** guess < correct\_num:  
 **return** -1  
 **elif** guess > correct\_num:  
 **return** 1  
  
  
# Prompt the user for a guess and loop until their guess is correct  
# Returns number of how many guesses the user needed  
**def loop\_guesses**(correct\_num, guess\_max):  
 guess = -1  
 guess\_count = 0  
  
 **while** guess != correct\_num:  
 guess = prompt\_guess()  
 guess\_count += 1  
  
 guess\_status = check\_guess(guess, correct\_num)  
  
 **if** guess\_status == 0:  
 **print** "Your guess was correct!"  
 **print** "You guessed the number in", guess\_count, "guesses!"  
  
 **return** guess\_count  
  
 **elif** guess\_status == -1:  
 **print** "Your guess was too low. Try again!"  
 **else**:  
 **print** "Your guess was too high. Try again!"  
  
 **if** guess\_count == guess\_max:  
 **print** "You're out of guesses!"  
 **print** "The number I was thinking of was " + str(correct\_num) + "!"  
 **return** guess\_max + 1  
  
 **print**# Calculate the user's winnings based on their number of guesses  
**def calc\_winnings**(guess\_count, guess\_max):  
 **if** guess\_count == guess\_max + 1:  
 **return** -10  
 **if** guess\_count == guess\_max:  
 **return** 0  
  
 **return** guess\_max - guess\_count + 1

# Display the user's winnings for the round, along with their total winnings  
**def show\_winnings**(win\_round, win\_total):  
 **if** win\_round >= 0:  
 **print** "You won $" + str(win\_round) + " this round"  
 **else**:  
 **print** "You have lost $" + str(abs(win\_round)) + " this round"  
  
 **if** win\_total > 0:  
 **print** "You have $" + str(win\_total) + " so far"  
 **else**:  
 **print** "You have -$" + str(abs(win\_total)) + " so far"  
  
 **print**# Prompts the user to ask them if they want to go to the next round  
**def prompt\_repeat**():  
 prompt = raw\_input("Would you like to play another round (y/n)? ")  
  
 prompt = prompt.lower()  
  
 **if** prompt == 'y' **or** prompt == 'yes':  
 **return** True  
 **elif** prompt == 'n' **or** prompt == 'no':  
 **return** False  
 **else**:  
 "I'm sorry, I don't know what you're saying."  
 **print  
 return** prompt\_repeat()  
  
  
# Loop through each of the game rounds, stopping when the user decides to exit  
**def loop\_rounds**():  
 playing = True  
 game\_winnings = 0  
  
 **while** playing:  
  
 num = generate\_num()  
 range\_num = get\_range(num)  
 guess\_max = get\_guess\_count(range\_num)  
  
 show\_rules(range\_num, guess\_max, game\_winnings)  
  
 guesses = loop\_guesses(num, range\_num, guess\_max)  
 round\_winnings = calc\_winnings(guesses, guess\_max)  
 game\_winnings += round\_winnings  
  
 show\_winnings(round\_winnings, game\_winnings)  
  
 playing = prompt\_repeat()  
  
loop\_rounds()

I am thinking of a number between 1001 and 15000

You have 14 guesses allowed.

You have $0 right now.

If you take too many guesses, you will lose $28.

If you take fewer than that, you will receive a reward:

1 $14

2 $13

3 $12

...

13 $2

14 $0

Can you guess what number I'm thinking of? 7500

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 5000

Your guess was too low. Try again!

Can you guess what number I'm thinking of? 6500

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 6000

Your guess was too low. Try again!

Can you guess what number I'm thinking of? 6250

Your guess was too low. Try again!

Can you guess what number I'm thinking of? 6350

Your guess was too low. Try again!

Can you guess what number I'm thinking of? 6450

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 6400

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 6375

Your guess was too low. Try again!

Can you guess what number I'm thinking of? 6390

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 6385

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 6380

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 6378

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 6376

Your guess was too low. Try again!

You're out of guesses!

The number I was thinking of was 6377!

You have lost $10 this round

You have -$10 so far

Would you like to play another round (y/n)? y

I am thinking of a number between 15001 and 100000

You have 17 guesses allowed.

You have $-10 right now.

If you take too many guesses, you will lose $34.

If you take fewer than that, you will receive a reward:

1 $17

2 $16

3 $15

...

16 $2

17 $0

Can you guess what number I'm thinking of? 75000

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 40000

Your guess was too low. Try again!

Can you guess what number I'm thinking of? 55000

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 50000

Your guess was too low. Try again!

Can you guess what number I'm thinking of? 52500

Your guess was too low. Try again!

Can you guess what number I'm thinking of? 53500

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 53000

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 52750

Your guess was too low. Try again!

Can you guess what number I'm thinking of? 52800

Your guess was too low. Try again!

Can you guess what number I'm thinking of? 52900

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 52850

Your guess was too low. Try again!

Can you guess what number I'm thinking of? 52875

Your guess was too low. Try again!

Can you guess what number I'm thinking of? 52890

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 52885

Your guess was too low. Try again!

Can you guess what number I'm thinking of? 52888

Your guess was too high. Try again!

Can you guess what number I'm thinking of? 52886

Your guess was too low. Try again!

Can you guess what number I'm thinking of? 52887

Your guess was correct!

You guessed the number in 17 guesses!

You won $0 this round

You have -$10 so far

Would you like to play another round (y/n)? n