| | |
|---|---|
| Candidate name: | Justin Leow |
| Centre number: | Dunman High School |
| Index number: | 7 |
| Programming language used: | Python3.3 |

# Question 1

## Evidence 1

*TASK 1.1 program code*

```
def bubble_sort(A):
  swapped = True # assume not sorted
  while swapped:
    swapped = False
    for i in range(1,len(A)):
      if A[i-1][0] < A[i][0]:
        A[i-1], A[i] = A[i], A[i-1]
        swapped = True
  return A

##main

bonusArr = []

for i in range(5):
      enumValidated = False
      bonusValidated = False
      while not enumValidated:
            uinput = input("Enter Employee number:")
            enumValidated = True #assume validated

            if uinput == "": #presence check
                  if i == 0:#empty input, does not want to quit
                        print("You must enter an employee number!")
                        enumValidated = False
                  else:#quit
                        done = True
                        break

            elif len(uinput) != 2:#length check
                  print("Employee number must be 2 characters in length!")
                  enumValidated = False

            elif uinput[0] != "E":
                  print("First character of Employee number must be an
'E'!")
                  enumValidated = False

            else:
                  try:
                        int(uinput[1])
                        enum = uinput
                  except:
                        print("second character of Employee number must be
an integer!")
                        enumValidated = False
```

```
	while not bonusValidated:
		uinput = input("Enter salary of Employee:")
		bonusValidated = True #assume validated

		if uinput == "": #presence check
			#empty input, does not want to quit
			print("You must enter an employee number!")
			bonusValidated = False

		try:
			uinput = int(uinput)

			if not 10 <= uinput <= 5000:
				print("Salary must be between 10 and 5000
inclusive")
				bonusValidated = False
			else:
				salary = uinput

		except:
			print("The salary has to be an integer!")
			bonusValidated = False

	if salary < 1000:
		bonus = 0.1 * salary
	elif salary < 3000:
		bonus = 0.15 * salary
	else: #salary >= 3000
		bonus = 0.25 * salary

	bonus = "{0:.2f}".format(bonus)

	employee = [bonus,enum]


	bonusArr.append(employee)

bonusArr = bubble_sort(bonusArr)

with open("BONUS.txt","w") as outfile:
	for line in bonusArr:
		string = line[1] + " " + str(line[0]) + "\n"
		outfile.write(string)
```

## Evidence 2

*Screenshots + Annotation*

```
Enter Employee number, or simply press enter to exit:
You must enter an employee number!
```

Entered empty string. Returned appropriate error

```
Enter Employee number, or simply press enter to exit:a
Employee number must be 2 characters in length!
```

Entered inappriopriate length.

```
Enter Employee number, or simply press enter to exit:ab
First character of Employee number must be an 'E'!
Enter Employee number, or simply press enter to exit:Eb
second character of Employee number must be an integer!
```

Entered wrong format which returned appriopriate error

```
Enter Employee number, or simply press enter to exit:E1
Enter salary of Employee:b
The salary has to be an integer!
```

Entered inappriopriate format for salary

```
Enter salary of Employee:0
Salary must be between 10 and 5000 inclusive
Enter salary of Employee:5001
Salary must be between 10 and 5000 inclusive
Enter salary of Employee:5000
```

Entered inappropriate ranges for salary

```
Enter Employee number:E1
Enter salary of Employee:2425
Enter Employee number:E2
Enter salary of Employee:133
Enter Employee number:E3
Enter salary of Employee:456
Enter Employee number:E4
Enter salary of Employee:4788
Enter Employee number:E5
Enter salary of Employee:2000
```

Entered all employees successfully

1.1.py | BONUS.txt

```
E3 45.60
E1 363.75
E5 300.00
E2 13.30
E4 1197.00
```

Bonus recorded appropriately

# Question 2

## Evidence 3

*Task 2.1 program code*

```
def Fibonacci(n):
      if n == 0:
            return 0
      if n == 1:
            return 1

      return Fibonacci(n-1) + Fibonacci(n-2)

##main
print(Fibonacci(10))
```

## Evidence 4

*Screenshot*

```
Justin-Leows-MacBook-Pro:promo JLtheking$ python3 2.1.py
55
```

## Evidence 5

*Task 2.2 program code*

```
fibArr = [0,1]
for i in range(100):
      fibArr.append("")

def Fibonacci(n):
      if n == 0:
```

```
            return 0
      if n == 1:
            return 1

      try:
            newfib = int(fibArr[n-1] + fibArr[n-2])

            fibArr[n] = newfib
            return fibArr[n]
      except:#fibArr[n-1] has not been calculated yet
            return Fibonacci(n-1) + Fibonacci(n-2)

##main
print(Fibonacci(50))
```

## Evidence 6

*Screenshot*

```
Justin-Leows-MacBook-Pro:promo JLtheking$ python3 2.2.py
12586269025
```

## Evidence 7

*Task 2.3 program code*

```
def Fibonacci(n):
      if n == 0:
            return 0
      if n == 1:
            return 1

      firstNum = 0
      secondNum = 1
      for i in range(1,n):
            ans = firstNum + secondNum
            firstNum = secondNum
            secondNum = ans

      return ans

##main
print(Fibonacci(50))
```

## Evidence 8

*Screenshot*

```
Justin-Leows-MacBook-Pro:promo JLtheking$ python3 2.3.py
12586269025
```

# Question 3

## Evidence 9

*Task 3.1 program code*

```
def GetCheckDigit(IMEI):
      imeiSum = 0
      for i in range(14):
            if i % 2 == 0:#even
                  imeiSum += int(IMEI[i])
            else: #odd
                  tempSum =  2 * int(IMEI[i])
                  if tempSum >= 10:
                        tempSum = str(tempSum)
                        imeiSum += int(tempSum[0]) + int(tempSum[1])
                  else:
                        imeiSum += tempSum

      checkDigit = imeiSum % 10
      if checkDigit == 0:
            return 0
```

```
	else:
		return 10 - checkDigit

def IsValidIMEI(IMEI):
	if len(IMEI) != 15: #length check
		return False
	try:
		int(IMEI)
	except: #check if IMEI is an integer
		return False
	if not GetCheckDigit(IMEI) == int(IMEI[14]):
		return False
	else:
		return True


##main
done = False
while not done:
	foo = input("Input IMEI:")
	if foo == "":
		done = True
	else:
		print(IsValidIMEI(foo))
```

## Evidence 10

*Screenshot*

```
Input IMEI:335023350497598
True
Input IMEI:528287381556221
False
```

## Evidence 11

*Task 3.2 program code*

```
def GetCheckDigit(IMEI):
	imeiSum = 0
	for i in range(14):
		if i % 2 == 0:#even
			imeiSum += int(IMEI[i])
		else: #odd
			tempSum =  2 * int(IMEI[i])
			if tempSum >= 10:
				tempSum = str(tempSum)
				imeiSum += int(tempSum[0]) + int(tempSum[1])
			else:
				imeiSum += tempSum

	checkDigit = imeiSum % 10
	if checkDigit == 0:
		return 0
	else:
		return 10 - checkDigit

def IsValidIMEI(IMEI):
	if len(IMEI) != 15: #length check
		return False
	try:
		int(IMEI)
	except: #check if IMEI is an integer
		return False
	if not GetCheckDigit(IMEI) == int(IMEI[14]):
		return False
	else:
		return True
```

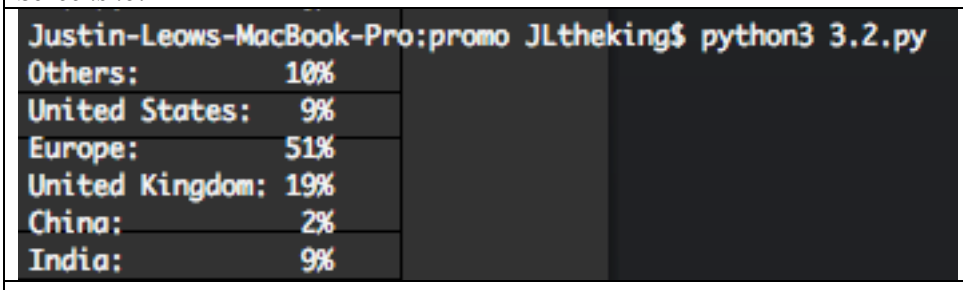
```
##main
Others = 0
US = 0
Europe = 0
UK = 0
China = 0
India = 0

with open("IMEIS.txt","r") as infile:
      line = infile.readline()
      while line != "":
            if not IsValidIMEI:
                  print(line + " is not a valid IMEI")
            else:
                  rbi = line[:2]
                  if rbi == "01" or rbi == "30":
                        US += 1
                  elif rbi == "33" or rbi == "45" or 49 <= int(rbi) <= 54:
                        Europe += 1
                  elif rbi == "35" or rbi == "44" or rbi == "98":
                        UK += 1
                  elif rbi == "86":
                        China += 1
                  elif rbi == "91":
                        India += 1
                  else:
                        Others += 1
                  #determine origin of mobile device, and increase the
counter of the respective distribution

            line = infile.readline()
print("Others:         {0:>2}%".format(Others))
print("United States:  {0:>2}%".format(US))
print("Europe:         {0:>2}%".format(Europe))
print("United Kingdom: {0:>2}%".format(UK))
print("China:          {0:>2}%".format(China))
print("India:          {0:>2}%".format(India))
```

## Evidence 12

*Screenshot*




## Evidence 13

*Task 3.3 program code*

```
def GetCheckDigit(IMEI):
      imeiSum = 0
      for i in range(14):
            if i % 2 == 0:#even
                  imeiSum += int(IMEI[i])
            else: #odd
                  tempSum =  2 * int(IMEI[i])
                  if tempSum >= 10:
                        tempSum = str(tempSum)
```

```
                        imeiSum += int(tempSum[0]) + int(tempSum[1])
                  else:
                        imeiSum += tempSum

      checkDigit = imeiSum % 10
      if checkDigit == 0:
            return 0
      else:
            return 10 - checkDigit

def GenerateIMEI():
      with open("CHINA.txt","w") as outfile:
            #generate IMEIs with model number 123456
            currSerial = 1
            for i in range(20000):
                  currSerialStr = str(currSerial)
                  while len(currSerialStr) < 6:
                        currSerialStr = "0" + currSerialStr
                  currIMEI = "86123456" + currSerialStr
                  currIMEI = currIMEI + str(GetCheckDigit(currIMEI)) + "\n"
                  outfile.write(currIMEI)

                  currSerial += 1

            #generate IMEIS with model number 234567
            currSerial = 1
            for i in range(30000):
                  currSerialStr = str(currSerial)
                  while len(currSerialStr) < 6:
                        currSerialStr = "0" + currSerialStr
                  currIMEI = "86234567" + currSerialStr
                  currIMEI = currIMEI + str(GetCheckDigit(currIMEI)) + "\n"
                  outfile.write(currIMEI)

                  currSerial += 1

##main
GenerateIMEI()
```

**Evidence 14**

*Partial screenshots*

```
861234560000013
861234560000021
861234560000039
861234560000047
861234560000054
861234560000062
861234560000070
861234560000088
861234560000096
861234560000104
```

First ten IMEIs

| | |
|---|---|
| 9991 | 862345670299912 |
| 9992 | 862345670299920 |
| 9993 | 862345670299938 |
| 9994 | 862345670299946 |
| 9995 | 862345670299953 |
| 9996 | 862345670299961 |
| 9997 | 862345670299979 |
| 9998 | 862345670299987 |
| 9999 | 862345670299995 |
| 0000 | 862345670300009 |
| 0001 | |

Last ten IMEIs

## Evidence 15

*Task 3.4 program code*

```
class Stack():
      '''stack class'''

      def __init__(self):
            self.__list = []

      def push(self,element):
            self.__list.insert(0,element)

      def display(self):
            print("".join(self.__list))

def IMEI2HEX(quotient):
      quotient = int(quotient)
      convert = 0,1,2,3,4,5,6,7,8,9,'A','B','C','D','E','F'
      stack = Stack()

      while quotient > 15:
            rem = convert[quotient % 16]
            quotient = quotient // 16
            stack.push(str(rem))
      stack.push(str(convert[quotient]))
      stack.display()

def GetCheckDigit(IMEI):
      imeiSum = 0
      for i in range(14):
            if i % 2 == 0:#even
                  imeiSum += int(IMEI[i])
            else: #odd
                  tempSum =  2 * int(IMEI[i])
                  if tempSum >= 10:
                        tempSum = str(tempSum)
                        imeiSum += int(tempSum[0]) + int(tempSum[1])
                  else:
                        imeiSum += tempSum

      checkDigit = imeiSum % 10
      if checkDigit == 0:
            return 0
      else:
            return 10 - checkDigit

def IsValidIMEI(IMEI):
      if len(IMEI) != 15: #length check
```

```
            return False
      try:
            int(IMEI)
      except: #check if IMEI is an integer
            return False
      if not GetCheckDigit(IMEI) == int(IMEI[14]):
            return False
      else:
            return True

##main
done = False
while not done:
      uinput = input("Input IMEI:")
      if uinput == "":
            done = True
      else:
            if not IsValidIMEI(uinput):
                  print("invalid IMEI")
            else:
                  IMEI2HEX(uinput)
```

**Evidence 16**

*Screenshot*

```
Justin-Leows-MacBook-Pro:promo JLtheking$ python3 3.4.py
Input IMEI:867849908066105
3154E0D7D1739
Input IMEI:
```

# Question 4

**Evidence 17**

*TASK 4.1 program code*

```
import random
import datetime

##main
username = input("Enter username:")
timestamp = datetime.datetime.now()
timestamp = timestamp.strftime("%Y-%m-%d %H:%M:%S")
print("Hello " + username + "!")
print("The time now is " + timestamp)

with open("LEADERBOARD.DAT","r") as infile:
      leaderArr = []

      line = infile.readline()
      while line != "":
            leader = line.split(",")
            leaderArr.append(leader)
            line = infile.readline()


for leader in leaderArr:
      print("The current game leader is " + leader[1] + " with a score of "
+ leader[2])


with open("QUESTIONS.DAT","r") as infile:
      line = infile.readline()
      qArr = []
      while line != "":
            if line[0] == "Q":
```

```
                    question = []
                    question.append(line)

                    line = infile.readline()
                    while line[0] == "A":
                          question.append(line)
                          line = infile.readline()
                          if line == "":
                                break

                    qArr.append(question)
numQ = len(qArr)
score = 0
done = False
while not done:
      proceed = input("Proceed? [y/n]")
      if proceed == "n":
            done = True
            break
      elif proceed == "y":
            for i in range(numQ):
                  print(qArr[i][0])
                  numA = len(qArr[i]) - 1
                  for j in range(1,numA):
                        print(qArr[i][j])
                  uinput = input("Enter Answer:")
                  correct = False
                  while not correct:
                        if uinput == "1":
                              print("correct!")
                              correct = True
                              score += 1
                        else:
                              print("wrong!")

      else:
            print("Invalid input.")
```

**Evidence 18**

*Annotated screenshots*

```
Enter username:JL
Hello JL!
The time now is 2013-09-26 11:43:22
The current game leader is limahseng with a score of 4

Proceed? [y/n]y
Q 1 byte has ___ bits.

A 8

A 16

Enter Answer:1
correct!
```

Prints timestamp, current highscore correctly

Checks for correct answer and tells user

**Evidence 19**

*TASK 4.2 program code*

| |
|---|
| [paste evidence here] |
| **Evidence 20**<br>*Annotated screenshots* |
| [paste evidence here] |