Computer Science Transition Work

Name:	

Must:

To convert a denary number (say 82) to binary the following process is used:

- Divide the number by 2, noting the remainders, until the result is 0
- Write the remainders from the bottom up

2|82

2|41 R 0

2|20 R 1

2|10 R 0

2|5 R 0

2|2 R 1

2|1 R 0

0 R 1

Remainders: 1010010

Task 1: Write a Python program to allow a user to enter a denary number and convert it to binary using this method. Return the answer as an 8-Bit pattern.

Task 2: Extend the program to reverse the process, taking an 8-Bit binary number and converting it to Denary.

Task 3: Develop a menu system

Should:

Consider the attached simple introduction to Object Oriented Programming

Task 1: Try the program

Task 2: It is not perfect! Make changes to improve the function of the program and use comments to explain these

Could:

Algorithms for common tasks such as searching and sorting are an important element of the course

- Linear Search
- Binary Search
- Bubble Sort
- Insertion Sort
- Quick Sort

Complete the activities for these algorithms in the tutorials on the following site.

http://www.pythonschool.net/category/data-structures-algorithms.html

Object Oriented Programming

The Virtual Baby

```
#object oriented example program
from time import sleep
class Baby(object):
    """Virtual Baby"""

    def __init__(self,name,hunger=0,nappy=0):
        print("A new baby has arrived!!")
        self.name=name
        self.hunger=hunger
        self.nappy=nappy

    def __pass_time(self):
        self.hunger+=1
        self.nappy+=1

    @property
    def mood(self):
        unhappiness=self.hunger+self.nappy
        if unhappiness<5:
            m="happy"
        elif 5<= unhappiness<=10:
            m="okay"
        elif 11<= unhappiness <=15:
            m="frustrated"
        else:
            m="mad"
        return m

    def __str__(self):
        rep="Baby Object\n"
        rep+="name: "+self.name+"\n"
        return rep

    def talk(self):
        print("Hi, I'm",self.name,"and I feel",self.mood,"now \n")
        self.__pass_time()

    def eat(self,food=4):
        print("NUM NUM NUM")
        sleep(5)
        print("BURRRRPPP!")
        self.hunger-=food
        if self.hunger<0:
            self.hunger=0
        self.__pass_time()
```

```
    def change(self,clean=4):
        print("Goo goo goo")
        self.nappy-=clean
        if self.nappy<0:
            self.nappy=0
        self.__pass_time()


#main part of the program

def main():
    babe_name=input("Please enter Baby name: ")
    babe=Baby(babe_name)

    choice= None
    while choice!="0":
        print("""

                0 - Quit
                1 - Listen to the Baby
                2 - Feed the Baby
                3 - Change nappy
        """)
        choice=input("Please enter choice: ")
        print()

        if choice=="0":
            print("Goodbye!")
        elif choice=="1":
            babe.talk()
        elif choice=="2":
            babe.eat()
        elif choice=="3":
            babe.change()
        else:
            print("Not a valid choice")

#program runs from here
main()


input("\n\nPress Enter to exit")
```