

**Name:****QUID:**

**Midterm Instructions:** The midterm is 45 minutes long. Use proper indentation/alignment in your code, the lines of the answer sheets are formatted for this purpose.

**Q.1 [5 POINTS]** A year is a **leap year** if it is divisible by 4 but not divisible by 100. Century year that is divisible by 100 like 300, 700, 1900, 2000 need to be divisible by 400 to be considered a leap year.

Write a program that receives a year and prints if it is a leap year or not a leap year. The program continues to do so until the user enters 0.

Hint: Divisible means the integer remainder of the division is zero.

### Sample Output

```
Enter a year or 0 to exit: 2023
2023 is not a leap year
Enter a year or 0 to exit: 2024
2024 is a leap year
Enter a year or 0 to exit: 2000
2000 is a leap year
Enter a year or 0 to exit: 0
```

```
# Q1
year = int(input("Enter a year or 0 to exit: "))
while year!=0:
    if year%4==0 and year%100!=0:
        print(f'{year} is a leap year')
    elif year%400==0:
        print(f'{year} is a leap year')
    else:
        print(f'{year} is not a leap year')
    year = int(input("Enter a year or 0 to exit: "))
```

**Q.2 [7 POINTS]** Body Mass Index (BMI) is a measure of body fat based on height and weight that applies to adult men and women.  $BMI = \text{weight (kg)} \div (\text{height (m)})^2$

**Example:** For a 177 cm (1.77 m) individual weighing 75 kg,  $BMI = 75 / (1.77 * 1.77) = 75 / 3.13 = 23.96$

**BMI Categories:** Underweight: BMI < 18.5, Normal weight: BMI of [18.5–25), Overweight: BMI of [25–30), Obesity: BMI of [30–35], Morbid obesity: BMI over 35.

Write a program that reads the **height** in **cm** the **weight** in **kg** to calculate the BMI and display the value of the BMI followed by the appropriate BMI category. Each of the weight and height values must be greater than 0. Your program gives a maximum of three trials to enter valid values before it decides to exit.

### Sample Output

```
Enter your weight in kg: -67
Enter your weight in kg: 0
Enter your weight in kg: 90
Enter your height in cm: -190
Enter your height in cm: 186
Your BMI is 26.01. Overweight: BMI of [25-30)
```

```
# Q2
C1='Underweight: <18.5'
C2='Normal weight: BMI of [18.5-25)'
C3='Overweight: BMI of [25-30)'
C4='Obesity: BMI of [30-35]'
C5='Morbid obesity: BMI over 35'
weight=int(input('Enter your weight in kg: '))
attempt=1
while weight<=0 and attempt<3:
    attempt+=1
    weight=int(input('Enter your weight in kg: '))
if weight<=0: exit(0)
height=int(input('Enter your height in cm: '))
attempt=1
while height<=0 and attempt<3:
    attempt+=1
    height=int(input('Enter your height in cm: '))
if height<=0: exit(0)
height/=100
bmi = weight/pow(height,2)
C=""
if bmi<=18.5: C=C1
elif bmi<25: C=C2
elif bmi<30: C=C3
elif bmi<=35: C=C4
else: C=C5
print(f'Your BMI is {bmi:.2f}. {C}')
```

- Q.3 [8 POINTS]** Write a program to help the cashier taking orders only for beef meals at McDonald's. The program show the beef menu then for each order, it prompts for the meal's number and quantity. An order might have more than one type of meal and its quantity. At the end of the order the program asks if the customer is a Qatar university student to provide 20% discount on the total bill or not. Finally, the program prints the order as shown in the sample output. The system continues to run by showing the menu again and is ready to take the next order. Order number starts at 1 and is incremented by one for the next order. The fixed prices for the beef meals: Cheeseburger 7 QR, Big Mac 14 QR, Big Tasty 16 QR, Big Tasty Mushroom 21 QR.

### Sample Output

```
McDonald's Beef Menu
1: Cheeseburger 7 QR
2: Big Mac 14 QR
3: Big Tasty 16 QR
4: Big Tasty Mushroom 21 QR
Meal number: 3
Quantity: 1
Enter to continue order. Type E to end order:
Meal number: 2
Quantity: 4
Enter to continue order. Type E to end order: E
Enter Y if QU student or Enter if not: Y

ORDER 000001
Meal    Quantity
3       1
2       4
Total price: 72.00 QR Discount: 14.40 QR Amount to pay: 57.60 QR

McDonald's Beef Menu
1: Cheeseburger 7 QR
2: Big Mac 14 QR
3: Big Tasty 16 QR
4: Big Tasty Mushroom 21 QR
Meal number: 4
Quantity: 2
Enter to continue order. Type E to end order:
Meal number: 3
Quantity: 1
Enter to continue order. Type E to end order: E
Enter Y if QU student or Enter if not: N

ORDER 000002
Meal    Quantity
4       2
3       1
Total price: 16.00 QR Discount: 0.00 QR Amount to pay: 16.00 QR

McDonald's Beef Menu
1: Cheeseburger 7 QR
2: Big Mac 14 QR
3: Big Tasty 16 QR
4: Big Tasty Mushroom 21 QR
Meal number:
```

```
M1PRICE=7; M2PRICE=14;M3PRICE=16;M4PRICE=21
MENU=f"McDonald's Beef Menu\n1: Cheeseburger 7 QR\n2: Big Mac 14 QR\n\
3: Big Tasty 16 QR\n4: Big Tasty Mushroom 21 QR\n"
order=0
while True:
    order+=1
    output=f'\nORDER {order:06d}\n'
    output+=f'{"Meal":<10s}{"Quantity":<10s}\n'
    print(MENU)
    totalPrice=0
    discount=0
    while True:
        price=0
        meal=int(input("Meal number: "))
        quantity=int(input("Quantity: "))
        output+=f'{meal:<10d}{quantity:<10d}\n'
        if meal==1:
            price=M1PRICE
        elif meal==2:
            price=M2PRICE
        elif meal==3:
            price=M3PRICE
        else:
            price==M4PRICE
        totalPrice+=price*quantity
        end=input('Enter to continue order. Type E to end order: ')
        if end=='E':
            break
    student=input('Enter Y if QU student or Enter if not: ')
    if student=='Y':
        discount=0.2
    totDiscount=totalPrice*discount
    amountToPay=totalPrice-totDiscount
    output+=f'Total price: {totalPrice:<.2f} QR Discount: {totDiscount:<.2f} QR Amount to
pay: {amountToPay:<.2f} QR\n'
    print(output)
```