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COURSE: INTRODUCTION TO PROGRAMING

LECTUTURE: MASSOUD H. MMANGA

Question: 1 Day of the Week

Write a program that asks the user for a number in the range of 1 through 7. The program should display
the corresponding day of the week, where 1 = Monday, 2 = Tuesday, 3 = Wednesday, 4 = Thursday, 5 =
Friday, 6 = Saturday, and 7 = Sunday. The program should display an error message if the user enters a
number that is outside the range of 1 through 7.

Answer

code:

```
q1.py > ...
1    number = int(input("Enter a number between 1 and 7: "))
2
3    if number == 1:
4        print("Monday")
5    elif number == 2:
6        print("Tuesday")
7    elif number == 3:
8        print("Wednesday")
9    elif number == 4:
10       print("Thursday")
11   elif number == 5:
12       print("Friday")
13   elif number == 6:
14       print("Saturday")
15   elif number == 7:
16       print("Sunday")
17   else:
18       print("You entered a wrong number. Please enter a number between 1 and 7.")
19
```

Output:

```
smax@smax-The-great:~/Desktop/python$ python3 q1.py
Enter a number between 1 and 7: 4
Thursday
smax@smax-The-great:~/Desktop/python$ python3 q1.py
Enter a number between 1 and 7: 9
You entered a wrong number. Please enter a number between 1 and 7.
smax@smax-The-great:~/Desktop/python$
```

Question 2: Areas of Rectangles
The area of a rectangle is the rectangle's length times its width. Write a program that asks for the length
and width of two rectangles. The program should tell the user which rectangle has the greater area, or if
the areas are the same.

Code:

```python
length1 = float(input("Enter the length of the first rectangle: "))
width1 = float(input("Enter the width of the first rectangle: "))

area1 = length1 * width1

length2 = float(input("Enter the length of the second rectangle: "))
width2 = float(input("Enter the width of the second rectangle: "))

area2 = length2 * width2

if area1 > area2:
    print("Rectangle 1 has the greater area.")
elif area2 > area1:
    print("Rectangle 2 has the greater area.")
else:
    print("The rectangles have the same area.")
```

Output:

```
smax@smax-The-great:~/Desktop/python$ python3 q2.py
Enter the length of the first rectangle: 3
Enter the width of the first rectangle: 4
Enter the length of the second rectangle: 3
Enter the width of the second rectangle: 4
The rectangles have the same area.
smax@smax-The-great:~/Desktop/python$ python3 q2.py
Enter the length of the first rectangle: 3
Enter the width of the first rectangle: 4
Enter the length of the second rectangle: 5
Enter the width of the second rectangle: 4
Rectangle 2 has the greater area.
smax@smax-The-great:~/Desktop/python$ python3 q2.py
Enter the length of the first rectangle: 5
Enter the width of the first rectangle: 4
Enter the length of the second rectangle: 3
Enter the width of the second rectangle: 2
Rectangle 1 has the greater area.
smax@smax-The-great:~/Desktop/python$
```

Question 3: Age Classifier
Write a program that asks the user to enter a person's age. The program should display a message indicating whether the person is an infant, a child, a teenager, or an adult.
Following are the guidelines:
• If the person is 1 year old or less, he or she is an infant.
• If the person is older than 1 year, but younger than 13 years, he or she is a child.
• If the person is at least 13 years old, but less than 20 years old, he or she is a teenager.
• If the person is at least 20 years old, he or she is an adult.

Code:

```python
age = int(input("Enter the person's age: "))

if age <= 1:
    print("The person is an infant.")
elif age <= 12:
    print("The person is a child.")
elif age <= 19:
    print("The person is a teenager.")
else:
    print("The person is an adult.")
```

Output:

```
smax@smax-The-great:~/Desktop/python$ python3 q3.py
Enter the person's age: 1
The person is an infant.
smax@smax-The-great:~/Desktop/python$ python3 q3.py
Enter the person's age: 7
The person is a child.
smax@smax-The-great:~/Desktop/python$ python3 q3.py
Enter the person's age: 15
The person is a teenager.
smax@smax-The-great:~/Desktop/python$ python3 q3.py
Enter the person's age: 25
The person is an adult.
smax@smax-The-great:~/Desktop/python$
```

Question 4: Roman Numerals
Write a program that prompts the user to enter a number within the range of 1 through 10. The program
should display the Roman numeral version of that number. If the number is outside the range of 1
through 10, the program should display an error message. The following table shows the Roman numerals
for the numbers 1 through 10:

code:

```
q4.py > ...
1    number = int(input("Enter a number between 1 and 10: "))
2
3    if number == 1:
4        print("I")
5    elif number == 2:
6        print("II")
7    elif number == 3:
8        print("III")
9    elif number == 4:
10       print("IV")
11   elif number == 5:
12       print("V")
13   elif number == 6:
14       print("VI")
15   elif number == 7:
16       print("VII")
17   elif number == 8:
18       print("VIII")
19   elif number == 9:
20       print("IX")
21   elif number == 10:
22       print("X")
23   else:
24       print("You are outside the range.")
25
```

output:
```
smax@smax-The-great:~/Desktop/python$ python3 q3.py
Enter the person's age: 1
The person is an infant.
smax@smax-The-great:~/Desktop/python$ python3 q3.py
Enter the person's age: 7
The person is a child.
smax@smax-The-great:~/Desktop/python$ python3 q3.py
Enter the person's age: 15
The person is a teenager.
smax@smax-The-great:~/Desktop/python$ python3 q3.py
Enter the person's age: 25
The person is an adult.
smax@smax-The-great:~/Desktop/python$
```

Question 5:Areas of Rectangles
The area of a rectangle is the rectangle's length times its width. Write a program that asks for the length
and width of two rectangles. The program should tell the user which rectangle has the greater area, or if
the areas are the same.

Code:

```python
length1 = float(input("Enter the length of the first rectangle: "))
width1 = float(input("Enter the width of the first rectangle: "))

area1 = length1 * width1

length2 = float(input("Enter the length of the second rectangle: "))
width2 = float(input("Enter the width of the second rectangle: "))

area2 = length2 * width2

if area1 > area2:
    print("Rectangle 1 has the greater area.")
elif area2 > area1:
    print("Rectangle 2 has the greater area.")
else:
    print("The rectangles have the same area.")
```

Output:

```
smax@smax-The-great:~/Desktop/python$ python3 q2.py
Enter the length of the first rectangle: 3
Enter the width of the first rectangle: 4
Enter the length of the second rectangle: 3
Enter the width of the second rectangle: 4
The rectangles have the same area.
smax@smax-The-great:~/Desktop/python$ python3 q2.py
Enter the length of the first rectangle: 3
Enter the width of the first rectangle: 4
Enter the length of the second rectangle: 5
Enter the width of the second rectangle: 4
Rectangle 2 has the greater area.
smax@smax-The-great:~/Desktop/python$ python3 q2.py
Enter the length of the first rectangle: 5
Enter the width of the first rectangle: 4
Enter the length of the second rectangle: 3
Enter the width of the second rectangle: 2
Rectangle 1 has the greater area.
smax@smax-The-great:~/Desktop/python$
```

Question 6: Mass and Weight
Scientists measure an object's mass in kilograms and its weight in newtons. If you know the amount of
mass of an object in kilograms, you can calculate its weight in newtons with the following formula:
weight = mass / 9.8
Write a program that asks the user to enter an object's mass, and then calculates its weight. If the object
weighs more than 1,000 newtons, display a message indicating that it is too heavy. If the object weighs
less than 10 newtons, display a message indicating that it is too light.

Code:

```python
mass = float(input("Enter the object's mass in kilograms: "))

weight = mass / 9.8

if weight > 1000:
    print("The object is too heavy (weight:", weight, "newtons).")
elif weight < 10:
    print("The object is too light (weight:", weight, "newtons).")
else:
    print("The object has a weight of", weight, "newtons.")
```

Output:

```
smax@smax-The-great:~/Desktop/python$ python3 q6.py
Enter the object's mass in kilograms: 45
The object is too light (weight: 4.591836734693877 newtons).
smax@smax-The-great:~/Desktop/python$
```

Question 7: Magic Dates
The date June 10, 1960, is special because when it is written in the following format, the month times the
day equals the year: 6/10/60Design a program that asks the user to enter a month (in numeric form), a day, and a two digit year. The
program should then determine whether the month times the day equals the year. If so, it should display
a message saying the date is magic. Otherwise, it should display a message saying the date is not magic.

Code:

```python
q7.py > ...
1    month = int(input("Enter the month (in numeric form): "))
2    day = int(input("Enter the day: "))
3    year = int(input("Enter the two-digit year: "))
4
5    if month * day == year:
6        print("The date is magic!")
7    else:
8        print("The date is not magic.")
9
```

Output:

```
smax@smax-The-great:~/Desktop/python$ python3 q7.py
Enter the month (in numeric form): 2
Enter the day: 14
Enter the two-digit year: 99
The date is not magic.
smax@smax-The-great:~/Desktop/python$ python3 q7.py
Enter the month (in numeric form): 6
Enter the day: 10
Enter the two-digit year: 60
The date is magic!
smax@smax-The-great:~/Desktop/python$
```

Question 8: Color Mixer
The colors red, blue, and yellow are known as the primary colors because they cannot be made by mixing
other colors. When you mix two primary colors, you get a secondary color, as shown here:
When you mix red and blue, you get purple.
When you mix red and yellow, you get orange.
When you mix blue and yellow, you get green.
Design a program that prompts the user to enter the names of two primary colors to mix. If the user
enters anything other than "red," "blue," or "yellow," the program should display an error message.
Otherwise, the program should display the name of the secondary color that results.

Code:

```
q8.py > ...
1   primary_color1 = input("Enter the name of the first primary color: ").lower()
2   primary_color2 = input("Enter the name of the second primary color: ").lower()
3
4   if primary_color1 == "red" and primary_color2 == "blue":
5       print("Mixing", primary_color1, "and", primary_color2, "gives you purple!")
6   elif primary_color1 == "red" and primary_color2 == "yellow":
7       print("Mixing", primary_color1, "and", primary_color2, "gives you orange!")
8   elif primary_color1 == "blue" and primary_color2 == "yellow":
9       print("Mixing", primary_color1, "and", primary_color2, "gives you green!")
10  else:
11      print("Invalid primary colors")
12
```

Output:

```
smax@smax-The-great:~/Desktop/python$ python3 q8.py
Enter the name of the first primary color: red
Enter the name of the second primary color: blue
Mixing red and blue gives you purple!
smax@smax-The-great:~/Desktop/python$
```

Question 9: Change for a Dollar Game
Create a change-counting game that gets the user to enter the number of coins required to make exactly
one dollar. The program should prompt the user to enter the number of pennies, nickels, dimes, and quarters. If the total value of the coins entered is equal to one dollar, the program should congratulate
the user for winning the game. Otherwise, the program should display a message indicating whether the
amount entered was more than or less than one dollar.

Code:

```python
q9.py > ...
1    pennies = int(input("Enter the number of pennies: "))
2    nickels = int(input("Enter the number of nickels: "))
3    dimes = int(input("Enter the number of dimes: "))
4    quarters = int(input("Enter the number of quarters: "))
5
6    total_cents = pennies + nickels * 5 + dimes * 10 + quarters * 25
7
8    if total_cents == 100:
9        print("Congratulations! You win the game!")
10   else:
11
12       if total_cents > 100:
13           print("The amount entered is more than one dollar.")
14       else:
15           print("The amount entered is less than one dollar.")
16
```

Output:

```
smax@smax-The-great:~/Desktop/python$ python3 q9.py
Enter the number of pennies: 5
Enter the number of nickels: 4
Enter the number of dimes: 5
Enter the number of quarters: 4
The amount entered is more than one dollar.
```

Question 10: Change for a Dollar Game
Create a change-counting game that gets the user to enter the number of coins required to make exactly
one dollar. The program should prompt the user to enter the number of pennies, nickels, dimes, and
quarters. If the total value of the coins entered is equal to one dollar, the program should congratulate
the user for winning the game. Otherwise, the program should display a message indicating whether the
amount entered was more than or less than one dollar.

Code:

```
q10.py > ...
1
2    books_purchased = int(input("Enter the number of books you purchased this month: "))
3
4    if books_purchased == 0:
5        points = 0
6    elif books_purchased == 1:
7        points = 5
8    elif books_purchased == 2:
9        points = 15
10   elif books_purchased == 3:
11       points = 30
12   else:
13       points = 60
14
15   print("You earned", points, "points this month!")
16
```

Output:

```
smax@smax-The-great:~/Desktop/python$ python3 q10.py
Enter the number of books you purchased this month: 5
You earned 60 points this month!
```

Question 11:Software Sales
A software company sells a package that retails for $99. Quantity discounts are given according to the
following table:
Quantity
Discount
10–19
20%
20–49
30%
50–99
40%
100 or more
50%
Write a program that asks the user to enter the number of packages purchased. The program should then
display the amount of the discount (if any) and the total amount of the purchase after the discount.

Code:

```
q11.py > ...
1    quantity=int(input("Enter amount purchased: "))
2    price=99
3    amount=quantity*price
4    discount=""
5    if quantity>=10:
6        discount=amount*0.2
7    elif quantity>=20:
8        discount=amount*0.3
9    elif quantity>=50:
10       discount=amount*0.4
11   elif quantity<10:
12       discount=0
13   else:
14       discount=amount*0.5
15   print('Amount before Discount is:  $',amount)
16   print('Discount amount is:  $',discount)
17   print('Total amount after discount is: $',(amount-discount))
18
```

Output:

```
smax@smax-The-great:~/Desktop/python$ python3 q11.py
Enter amount purchased: 566
Amount before Discount is:  $ 56034
Discount amount is:  $ 11206.800000000001
Total amount after discount is: $ 44827.2
smax@smax-The-great:~/Desktop/python$
```

Question 12: Shipping Charges
The Fast Freight Shipping Company charges the following rates:
Weight of Package
Rate per Pound
2 pounds or less
$1.10
Over 2 pounds but not more than 6 pounds
$2.20
Over 6 pounds but not more than 10 pounds
$3.70
Over 10 pounds
$3.80
Write a program that asks the user to enter the weight of a package and then displays the shipping charges.

Code:

```
q12.py > ...
1    weight = float(input("Enter the weight of the package in pounds: ")
2
3    if weight <= 2:
4        rate_per_pound = 1.10
5    elif weight <= 6:
6        rate_per_pound = 2.20
7    elif weight <= 10:
8        rate_per_pound = 3.70
9    else:
10       rate_per_pound = 3.80
11
12   shipping_charges = weight * rate_per_pound
13
14   print("Shipping charges: $ ",shipping_charges)
15
```

Output:

```
smax@smax-The-great:~/Desktop/python$ python3 q12.py
Enter the weight of the package in pounds: 10
Shipping charges: $  37.0
smax@smax-The-great:~/Desktop/python$
```

Question 13:Body Mass Index
Program Enhancement In programming Exercise #6 in Chapter 3 you were asked to write a
program that calculates a person's
body mass index (BMI). Recall from that exercise that the BMI is often used to determine whether a
person is overweight or underweight for their height. A person's BMI is calculated with the formula
BMI =weight * 703 / height2
where weight is measured in pounds and height is measured in inches. Enhance the program so it
displays
a message indicating whether the person has optimal weight, is underweight, or is overweight. A
person's
weight is considered to be optimal if his or her BMI is between 18.5 and 25. If the BMI is less than
18.5,
the person is considered to be underweight. If the BMI value is greater than 25, the person is
considered
to be overweight.

Code:

```python
q13.py > ...
1    weight = float(input('Enter your weight: '))
2    height = float(input("Enter your height: "))
3
4    bmi = weight * 703 / height**2
5
6    if bmi < 18.5:
7        print("Underweight")
8    elif bmi >= 18.5 and bmi <= 25:
9        print("Optimal weight")
10   else:
11       print("Overweight")
12
```

Output:

```
smax@smax-The-great:~/Desktop/python$ python3 q13.py
Enter your weight: 77
Enter your height: 170
Underweight
```

Question 14: Time Calculator
Write a program that asks the user to enter a number of seconds, and works as follows:
• There are 60 seconds in a minute. If the number of seconds entered by the user is greater than or equal
to 60, the program should display the number of minutes in that many seconds.
• There are 3,600 seconds in an hour. If the number of seconds entered by the user is greater than or equal to 3,600, the program should display the number of hours in that many seconds.
• There are 86,400 seconds in a day. If the number of seconds entered by the user is greater than or equal
to 86,400, the program should display the number of days in that many seconds.

Code:

```python
q14.py > ...
1    seconds = int(input("Enter the number of seconds: "))
2
3    if seconds >= 86400:
4        days = seconds // 86400
5        seconds %= 86400
6        print(f"{days} days")
7
8    if seconds >= 3600:
9        hours = seconds // 3600
10       seconds %= 3600
11       print(f"{hours} hours")
12
13   if seconds >= 60:
14       minutes = seconds // 60
15       seconds %= 60
16       print(f"{minutes} minutes")
17
18   if seconds > 0:
19       print(f"{seconds} seconds")
20
```

Output:

```
smax@smax-The-great:~/Desktop/python$ python3 q14.py
Enter the number of seconds: 35555
9 hours
52 minutes
35 seconds
smax@smax-The-great:~/Desktop/python$
```

Question 15: Roulette Wheel Colors
On a roulette wheel, the pockets are numbered from 0 to 36. The colors of the pockets are as follows:
• Pocket 0 is green.
• For pockets 1 through 10, the odd-numbered pockets are red and the even-numbered pockets are black.
• For pockets 11 through 18, the odd-numbered pockets are black and the even-numbered pockets are red.
• For pockets 19 through 28, the odd-numbered pockets are red and the even-numbered pockets are black.
• For pockets 29 through 36, the odd-numbered pockets are black and the even numbered pockets are red.
Write a program that asks the user to enter a pocket number and displays whether the pocket is green, red, or black. The program should display an error message if the user enters a number that is outside the range of 0 through 36.

Code:

```python
pocket_number = int(input("Enter a pocket number (0-36): "))

if pocket_number == 0:
    color = "green"
elif 1 <= pocket_number <= 10:
    color = "red" if pocket_number % 2 == 1 else "black"
elif 11 <= pocket_number <= 18:
    color = "black" if pocket_number % 2 == 1 else "red"
elif 19 <= pocket_number <= 28:
    color = "red" if pocket_number % 2 == 1 else "black"
elif 29 <= pocket_number <= 36:
    color = "black" if pocket_number % 2 == 1 else "red"
else:
    color = "Invalid pocket number"

print("The pocket is", color)
```

Output:

```
smax@smax-The-great:~/Desktop/python$ python3 q15.py
Enter a pocket number (0-36): 5
The pocket is red
smax@smax-The-great:~/Desktop/python$
```