

1 ICS 104 - Introduction to Programming in Python and C

1.1 Decision Structures - Lab 2

2 Lab Learning Outcomes

- To learn how to program simple and complex decisions.
- To implement decisions using if statements
- To write statements using Boolean expressions
- To validate user input

- [Exercise# 1](#): Write a program that reads a temperature value and the letter C for Celsius or F for Fahrenheit. Print whether water is liquid, solid, or gaseous at the given temperature at sea level.
- You can use the following formula to convert from Fahrenheit to Celsius $C = \frac{5 \times (F - 32)}{9}$

Sample Run

Enter the temperature: 30
Enter the unit (C or F): F
At that temperature, the water is solid.

Sample Run

Enter the temperature: 150
Enter the unit (C or F): C
At that temperature, the water is gaseous.

Sample Run

Enter the temperature: 70
Enter the unit (C or F): F
At that temperature, the water is liquid.

In [8]:

```
1  #exercise #1
2  # YOUR CODE HERE
3
4  temperature = int(input("Enter the temperature: "))
5  unit = str(input("Enter the unit (C or F): "))
6
7  if unit == "F" or unit == "f":
8      temperature = (5 * (temperature - 32))/9
9
10     if temperature >= 100:
11         print("At that temperature, the water is gaseous.")
12     elif 100 > temperature > 0:
13         print("At that temperature, the water is liquid.")
14     else:
15         print("At that temperature, the water is solid.")
16
17 elif unit == "C" or unit == "c":
18
19     if temperature >= 100:
20         print("At that temperature, the water is gaseous.")
21     elif 100 > temperature > 0:
22         print("At that temperature, the water is liquid.")
23     else:
24         print("At that temperature, the water is solid.")
25
26 else:
27     print("Wrong unit")
28
```

Enter the temperature: 22

Enter the unit (C or F): f

At that temperature, the water is solid.

- **Exercise# 2:** A supermarket awards coupons depending on how much a customer spends on groceries. For example, if you spend \$50, you will get a coupon worth eight percent of that amount. The following table shows the percent used to calculate the coupon awarded for different amounts spent. Write a program that calculates and prints the value of the coupon a person can receive based on groceries purchased. A sample run is as follows:

Note: If the cost is not valid, your program will display the following message:

"the cost must be a positive value"

Please enter the cost of your groceries: 14
You win a discount coupon of \$ 1.12. (8% of your purchase)

Money Spent	Coupon Percentage
Less than \$10	No coupon
From \$10 to \$60	8%
More than \$60 to \$150	10%
More than \$150 to \$210	12%
More than \$210	14%

```
1 Sample runs
2 Please enter the cost of your groceries: 7
3 You win a discount coupon of $0.00. (0% of your purchase)
4
5 Please enter the cost of your groceries: 59.9
6 You win a discount coupon of $4.79. (8% of your purchase)
7
8 Please enter the cost of your groceries: 210
9 You win a discount coupon of $29.40. (14% of your purchase)
10
11 Please enter the cost of your groceries: -20.5
12 the cost must be a positive value
```

In [2]:

```
1 #exercise #2
2 # YOUR CODE HERE
3
4 #exercise #2
5 # YOUR CODE HERE
6
7 moneySpent = float(input("Please enter the cost of your groceries: "))
8
9 if 10 > moneySpent > 0:
10     coupon= 0.00
11     discountValue = moneySpent*coupon
12     print("You win a discount coupon of $ " "%.2f" % discountValue , "." , " (0% of your purchase)"
13         ,sep="")
14 else:
15     if 60>= moneySpent >= 10 :
16         coupon = 0.08
17         discountValue = moneySpent*coupon
18         print("You win a discount coupon of $", "%.2f"% discountValue , "." , " (8% of your purchase)"
19             ,sep="")
20     elif 150 >= moneySpent > 60 :
21         coupon = 0.10
22         discountValue = moneySpent*coupon
23         print("You win a discount coupon of $", "%.2f"% discountValue , "." , " (10% of your purchase)"
24             ,sep="")
25     elif 210 >= moneySpent > 150:
26         coupon = 0.12
27         discountValue = moneySpent*coupon
28         print("You win a discount coupon of $", "%.2f"% discountValue , "." , " (12% of your purchase)"
29             ,sep="")
30     elif moneySpent > 210:
31         coupon = 0.14
32         discountValue = moneySpent*coupon
33         print("You win a discount coupon of $", "%.2f"% discountValue , "." , " (14% of your purchase)"
34             ,sep="")
35     else:
36         print("the cost must be a positive value")
```

Please enter the cost of your groceries: -20.5
the cost must be a positive value

- **Exercise# 3:** Write a program that asks the user to enter a month (1 for January, 2 for February, and so on) and then prints the number of days in the month. For February, print "28 or 29 days".

- Enter a month:5 30 days
- Do not use a separate if/else branch for each month. Use Boolean operators.
- months with 30 days: 4, 6, 9, 11

Sample Run	Sample Run	Sample Run	Sample Run
Enter a month: 6 30 days	Enter a month: 3 31 days	Enter a month: 2 28 or 29 days	Enter a month: 0 Wrong input

In [13]:

```
1 #exercise #3
2 # YOUR CODE HERE
3
4 mon= int(input("Enter a month: "))
5 if mon==1 or mon==3 or mon== 5 or mon ==7 or mon==8 or mon==10 or mon==12:
6     print("31 days")
7 elif mon !=2 and mon<12 and mon>0:
8     print("30 days")
9 elif mon==2:
10     print("28 or 29 days")
11 else:
12     print("Wrong input")
```

Enter a month: 2
28 or 29 days

- [Exercise# 4](#): Write a program that prompts the user to provide a single character from the alphabet. Print Vowel or Consonant, depending on the user input. If the user input is not a letter (between a and z or A and Z), or is a string of length > 1, print an error message.

Sample Run	Sample Run	Sample Run	Sample Run
Enter one character: python That input didn't have a valid length.	Enter one character: B Consonant	Enter one character: e Vowel	Enter one character: & That was neither a vowel nor a consonant.

In [20]:

```
1  #exercise #4
2  # YOUR CODE HERE
3
4  #exercise #4
5  # YOUR CODE HERE
6
7  string = input("Enter one character: ")
8
9  if len(string) > 1 :
10     print("That input didn't have a valid length ")
11
12  elif not string.isalpha():
13     print("That was neither a vowel nor a consonant. ")
14
15  else:
16     letter = string.upper()
17     if letter == "A" or letter=="E" or letter=="I" or letter== "O" or letter=="U":
18         print("Vowel")
19     else:
20         print("Consonant")
```

Enter one character: r
Consonant