Conditions and Logic II

1. What is the output of the following program? Draw the control flow chart. Provide different test values in order to get different outcomes.

```
def mystery(people: int, bikes: int, cars: int) -> None:
    if (bikes + cars > people):
        print("no need of walking...")
        if cars > bikes:
            print("too many cars")
        else:
            print("bikes may work")
    if bikes > people:
        print("bikes are cool")
    else:
        print("let's stay home then")
def main() -> None:
    mystery(30, 28, 10) # test 1
main()
```

2. What is the output of the following program? Draw the control flow chart. Provide different test values in order to get different outcomes.

```
def mystery(students: int, desks: int, professors: int) -> None:
    if (students + professors) > desks:
        print( "There are not enough desks!")
    else:
        print("There are enough desks for everyone to have their own.")
        leftover = desks - (students + professors)
        if leftover >= students:
            print("There will be A LOT of empty desks.")
        elif leftover >= professors:
            print("There will be exactly",leftover,"empty desks.")
        elif leftover >= 1:
            print("There will be at least one empty desk.")
        else:
            print("There will not be any empty desks." )
def main() -> None:
    mystery(28, 100, 5) # test 1
main()
```

3. What is the output of the following program? Draw the control flow chart. Provide different test values in order to get different outcomes.

```
def mystery(temperature: int, thickness: float) -> None:
    if (temperature >= -9 and temperature <= -5):
        print(temperature, "C is good for speed skating")
        if (thickness < 2.5):
            more = 2.5 - thickness
            print("The ice needs to be", more, "cm thicker")
        else:
            print(thickness, "cm is thick enough ice")
        print("According to Mark Messer")
    elif (temperature < -3):
        print(temperature, "C is good for figure skating")
        if (thickness >= 4.5 and thickness <= 5):
            print(thickness, "cm ice is good")
    else:
        print("The ice is all wrong")
def main() -> None:
    mystery(-7, 2.0) #test 1
main()
```

4. Rewrite the program below to have only a single if statement. Your solution must have exactly one `if`, zero or more `elif` branches, and zero or one `else` branch. (In your solution, you need only rewrite the part below the comment.) Draw the control flow chart and use it in the simplification.

```
def main() -> None:
    response = input("Is it raining out? ")
    rainy = response == 'yes'
    wind = int(input("What is the wind speed? "))
    # rewrite the program from here down...
    if rainy:
        if wind > 30:
            print ("Wear your rain slicker!")
        else:
            print ("Bring your umbrella!")
    else:
        if wind > 30:
            print ("Wear your windbreaker!")
main()
```

5. Rewrite the program below to have only a single if statement. Your solution must have exactly one `if`, zero or more `elif` branches, and zero or one `else` branch. (In your solution, you need only rewrite the part below the comment.) Draw the control flow chart and use it in the simplification.

```
def main() -> None:
    response = input("Is it raining out? ")
    rainy = response == 'yes'
    month = int(input("Enter the month: "))
    A = "Ride your snowmobile to class."
    B = "Take the shuttle."
    C = "Ride your bike to class."

    # rewrite the program from here down...
    if month > 10:
        print(A)
    if month < 3:
        print(A)
    else:
        if rainy:
            print(B)
        else:
            print(C)
main()
```