Making Decision with code

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Every day we are faced with decisions

Should I drive or take the bus?
Should I cook at home or go out for dinner?
Which laptop should I buy?

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The choice we make depends on different conditions

Am I late? What's the price of gas?

Do I have any food at home? Do I have enough money to go out?

How much RAM do I need? How much money do I have?

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If your code is going to solve problems, it has to make decisions as well

If the user maintained a bank account balance over $1000 waive the transaction fees
If a user cancels their appointment less than 24 hours before the appointment time, charge a cancellation fee
If the hockey player gets the puck in the net, ad

If statements allow you to specify code that only executes if a specific condition is true

```
answer=input("Would you like express shipping?")
if answer == "yes" :
    print("That will be an extra $10")
```

What do you think the == symbol means?

You can use different symbols to check for different conditions

==	is equal to	`if answer == "yes" :`
!=	is not equal to	`if answer !=  "no" :`
<	is less than	`if total < 100 :`
>	is greater than	`if total > 100 :`
<=	is less than or equal to	`if total <= 100 :`
>=	is greater than or equal to	`if total >= 100 :`

If statements allow you to specify code that only executes if a specific condition is true

```
answer=input("Would you like express shipping? ")
if answer == "yes" :
    print("That will be an extra $10")
print("Have a nice day")
```

Does it matter if that print statement is indented?

YES – the indented code is only executed if the condition is true

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Almost every if statement can be written two ways

```
if answer == "yes" :
if not answer == "no" :

if total < 100 :
if not total >= 100 :
```

Which do you prefer?

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Write it the way you would say it

```
if courseCompleted == "yes" :
if total < 50 :
if not vaccinated ==  "yes" :
```

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What do you think will happen if we type “YES” instead of “yes”

```
answer=input("Would you like express shipping? ")
if answer == "yes" :
      print("That will be an extra $10")
print("Have a nice day")
```

One of the challenges of working with strings of characters, is that the computer considers “y” and “Y” to be two different letters.

Is there a way we could change a string from uppercase to lowercase?

```
answer=input("Would you like express shipping?")
if answer.lower() == "yes" :
     print("That will be an extra $10")
print("Have a nice day")
```

Hint: There were functions we could call for string variables

Hint: lower()

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What if we try an if statement with numbers instead of strings

```
deposit = 150
if deposit > 100 :
      print("You get a free toaster!")
print("Have a nice day")
```

What will appear on the screen if deposit is 150?

What will appear on the screen if deposit is 50?

What will appear on the screen if deposit is exactly 100?

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Working with numeric values and if statements

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Always test >,< and boundary conditions

```
deposit = 150
if deposit > 100 :
      print("You get a free toaster!")
print("Have a nice day")
```

So when you test this code, try:

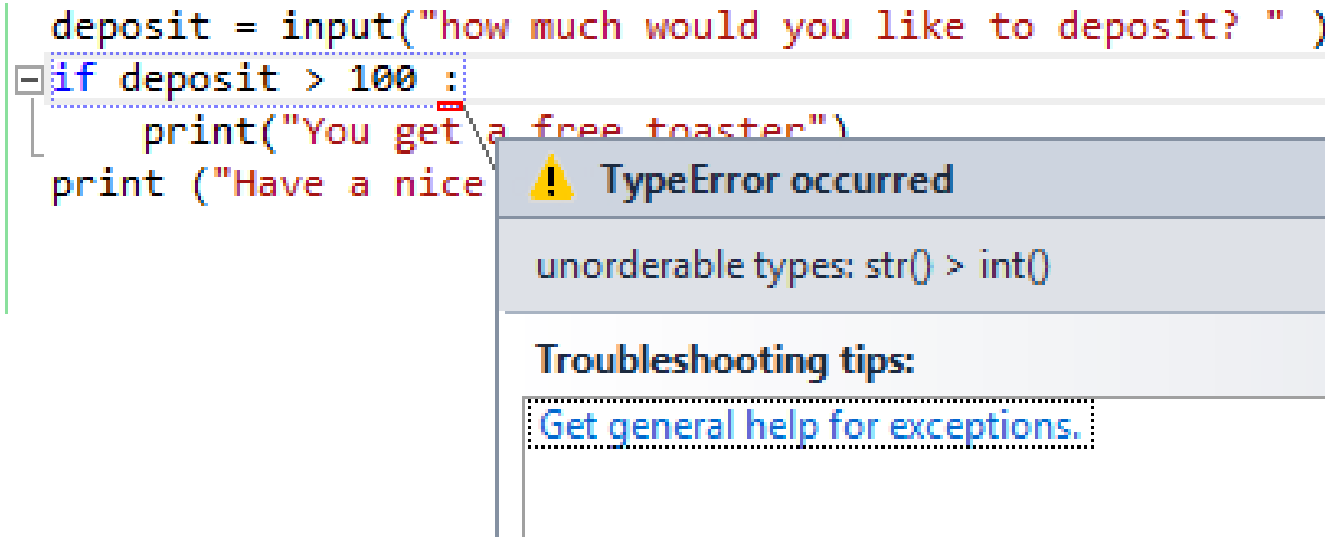
- a value less than 100
- a value greater than 100
- exactly 100

How could we let the user enter the amount to deposit?

```
deposit=input("How much would you like to deposit? ")
if deposit > 100 :
      print("You get a free toaster!")
print("Have a nice day")
```

Why did our code crash?

How can we fix it?



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We have to convert the string value returned by the input function to a number

```
deposit=input("How much would you like to deposit? ")
if int(deposit) > 100 :
      print("You get a free toaster!")
print("Have a nice day")
```

Here is another way to do the same thing

```
deposit=int(input("How much would you like to deposit? "))
if deposit > 100 :
      print("You get a free toaster!")
print("Have a nice day")
```

What if you get a free toaster for over $100 and a free mug for under $100

```
deposit=input("How much would you like to deposit? ")
if float(deposit) > 100 :
      print("You get a free toaster!")
else:
   print("Enjoy your mug!")
print("Have a nice day")
```

The code in the *else* statement is only executed if the condition is NOT true

What will appear on the screen if we enter 50? 150? 100?

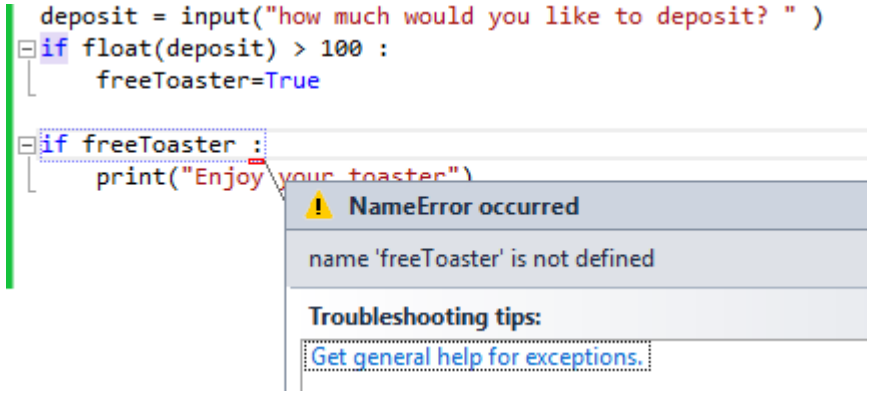
You can use boolean variables to remember if a condition is true or false

```
deposit= input("how much would you like to deposit? ")
if float(deposit) > 100 :
      #Set the boolean variable freeToaster to True
      freeToaster=True


#if the variable freeToaster is True
#the print statement will execute
if freeToaster :
      print("enjoy your toaster")
```

Make sure you test what happens when your if statement is true and what happens when your if statement is false.

Why does our code crash when we enter a value of 50 for a deposit?

```
deposit= input("how much would you like to deposit? ")
if float(deposit) > 100 :
      #Set the boolean variable freeToaster to True
      freeToaster=True


#if the variable freeToaster is True
#the print statement will execute
if freeToaster :
      print("enjoy your toaster")
```



Look at the error message: Name ‘freeToaster’ is not defined.

It's always a good idea to initialize your variables!

```
#Initialize the variable to fix the error
freeToaster=False

deposit= input("how much would you like to deposit?
")
if float(deposit) > 100 :
    #Set the boolean variable freeToaster to True
    freeToaster=True

#if the variable freeToaster is True
#the print statement will execute
if freeToaster :
    print("enjoy your toaster")
```

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Aren't you just making the code more complicated by using the Boolean variable?

That depends…
What if you are writing a program, and there is more than one place you have to check that condition? You could check the condition once and remember the result in the Boolean variable
What if the condition is very complicated to figure out? It might be easier to read your code if you just use a Boolean variable (often called a flag) in your if statement

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And now we have more ways to make typing mistakes! Can you find three?

```
deposit=input("How much would you like to deposit? ")
if float(deposit) > 100
     print("You get a free toaster!")
freeToaster=true
else:
    print("Enjoy your mug!")
print("Have a nice day")
```

```
deposit=input("How much would you like to deposit? ")
if float(deposit) > 100 :
     print("You get a free toaster!")
     freeToaster=True
else:
    print("Enjoy your mug!")
print("Have a nice day")
```

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Your challenge

Calculate shipping charges for a shopper
Ask the user to enter the amount for their total purchase
If their total is under $50 add $10, otherwise shipping is free
Tell the user their final total including shipping costs and format the number so it looks like a monetary value
Don’t forget to test your solution with

- a value > 50
- a value < 50
- a value of exactly 50

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Your challenge

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Calculate shipping charges for a shopper
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Tell the user their final total including shipping costs and format the number so it looks like a monetary value
Don’t forget to test your solution with

- a value > 50
- a value < 50
- a value of exactly 50

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Congratulations!

Your code can now react to different conditions!

You can now solve problems that require decision making