```python
# I declare that my work contains no examples of misconduct, such as plagarism.
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# Date:10/07/2022

#TaskA
def valid_datatype(amount):
    try:
        amount = int(amount)
        return True
    except:
        return False

amount = input("Cost of groceries: ")
if valid_datatype(amount):
    amount = int(amount)
if not valid_datatype(amount):
    print("Wrong data type")
elif amount <= 0:
    print("Cost of groceries should be greater than £0")
elif amount < 10:
    print("Less than £10 (No coupon)")
elif amount <= 60:
    print(f"Awarded a discount coupon of £{amount * 8 / 100} (8% of purchase)")
elif amount <= 150:
    print(f"Awarded a discount coupon of £{amount * 9 / 100} (9% of purchase)")
elif amount <= 210:
    print(f"Awarded a discount coupon of £{amount * 10 / 100} (10% of purchase)")
else:
    amount = amount * 11 / 100
    if amount > 33:
        amount = 33
        print(f"Awarded a discount coupon of £{amount} (capped)")
    else:
        print(f"Awarded a discount coupon of £{amount} (11% of purchase)")


#TaskB
def valid_datatype(amount):
    try:
        amount = int(amount)
        return True
    except:
        return False

total_amount = 0
total_discount = 0
no_coupon = 0
eight_per_coupon = 0
nine_per_coupon = 0
ten_per_coupon = 0
eleven_per_coupon = 0

while True:
    amount = input("Cost of groceries: ")
    if amount.lower() == "e":
        break
    if valid_datatype(amount):
        amount = int(amount)
        total_amount += amount
    if not valid_datatype(amount):
        print("Wrong data type")
    elif amount <= 0:
        print("Cost of groceries should be greater than £0")
    elif amount < 10:
        print("Less than £10 (No coupon)")
        no_coupon += 1
    elif amount <= 60:
        print(f"Awarded a discount coupon of £{amount * 8 / 100} (8% of purchase)")
        total_discount += (amount * 8 / 100)
        eight_per_coupon += 1
    elif amount <= 150:
        print(f"Awarded a discount coupon of £{amount * 9 / 100} (9% of purchase)")
        total_discount += (amount * 9 / 100)
        nine_per_coupon += 1
    elif amount <= 210:
        print(f"Awarded a discount coupon of £{amount * 10 / 100} (10% of purchase)")
        total_discount += (amount * 10 / 100)
        ten_per_coupon += 1
    else:
        amount = amount * 11 / 100
        if amount > 33:
            amount = 33
            print(f"Awarded a discount coupon of £{amount} (capped)")
            total_discount += 33
        else:
            print(f"Awarded a discount coupon of £{amount} (11% of purchase)")
            total_discount += amount
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            eleven_per_coupon += 1

print(f"\nTotal groceries: {total_amount}\nTotal discount: {total_discount}\n"
+ f"Groceries - discount: {total_amount - total_discount}\n")

customers = no_coupon + eight_per_coupon + nine_per_coupon + ten_per_coupon + eleven_per_coupon

print("Histogram")
print("<£10 (0%)        : " + ("*" * no_coupon))
print("£10-£60 (8%)     : " + ("*" * eight_per_coupon))
print("£61-£150 (9%)    : " + ("*" * nine_per_coupon))
print("£151-£210 (10%)  : " + ("*" * ten_per_coupon))
print(">£211 (11%/Cap)  : " + ("*" * eleven_per_coupon))

print("\n" + f"{customers} customers")


#TaskC
def valid_datatype(amount):
    try:
        amount = int(amount)
        return True
    except:
        return False

total_amount = 0
total_discount = 0
no_coupon = 0
eight_per_coupon = 0
nine_per_coupon = 0
ten_per_coupon = 0
eleven_per_coupon = 0

while True:
    amount = input("Cost of groceries: ")
    if amount.lower() == "e":
        break
    if valid_datatype(amount):
        amount = int(amount)
        total_amount += amount
    if not valid_datatype(amount):
        print("Wrong data type")
    elif amount <= 0:
        print("Cost of groceries should be greater than £0")
    elif amount < 10:
        print("Less than £10 (No coupon)")
        no_coupon += 1
    elif amount <= 60:
        print(f"Awarded a discount coupon of £{amount * 8 / 100} (8% of purchase)")
        total_discount += (amount * 8 / 100)
        eight_per_coupon += 1
    elif amount <= 150:
        print(f"Awarded a discount coupon of £{amount * 9 / 100} (9% of purchase)")
        total_discount += (amount * 9 / 100)
        nine_per_coupon += 1
    elif amount <= 210:
        print(f"Awarded a discount coupon of £{amount * 10 / 100} (10% of purchase)")
        total_discount += (amount * 10 / 100)
        ten_per_coupon += 1
    else:
        amount = amount * 11 / 100
        if amount > 33:
            amount = 33
            print(f"Awarded a discount coupon of £{amount} (capped)")
            total_discount += 33
        else:
            print(f"Awarded a discount coupon of £{amount} (11% of purchase)")
            total_discount += amount
        eleven_per_coupon += 1

print(f"\nTotal groceries: {total_amount}\nTotal discount: {total_discount}\n"
+ f"Groceries - discount: {total_amount - total_discount}\n")

customers = no_coupon + eight_per_coupon + nine_per_coupon + ten_per_coupon + eleven_per_coupon

print("Histogram")
print("<£10 (0%)        : " + ("*" * no_coupon))
print("£10-£60 (8%)     : " + ("*" * eight_per_coupon))
print("£61-£150 (9%)    : " + ("*" * nine_per_coupon))
print("£151-£210 (10%)  : " + ("*" * ten_per_coupon))
print(">£211 (11%/Cap)  : " + ("*" * eleven_per_coupon))

print("\n" + f"{customers} customers")

print("\n0%   8%   9%   10%  11%")
while True:
    if no_coupon > 0:
        print(" *   ", end="")
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            no_coupon -= 1
        else:
            print("     ", end="")

        if eight_per_coupon > 0:
            print(" *   ", end="")
            eight_per_coupon -= 1
        else:
            print("     ", end="")

        if nine_per_coupon > 0:
            print(" *   ", end="")
            nine_per_coupon -= 1
        else:
            print("     ", end="")

        if ten_per_coupon > 0:
            print(" *   ", end="")
            ten_per_coupon -= 1
        else:
            print("     ", end="")

        if eleven_per_coupon > 0:
            print(" *   ")
            eleven_per_coupon -= 1
        else:
            print("     ")

        if no_coupon <= 0 and eight_per_coupon <= 0 and nine_per_coupon <= 0 and ten_per_coupon <= 0 and eleven_per_coupon <= 0:
            break

#TaskD
from dis import dis


def valid_datatype(amount):
    try:
        amount = int(amount)
        return True
    except:
        return False

total_amount = 0
total_discount = 0
no_coupon = 0
eight_per_coupon = 0
nine_per_coupon = 0
ten_per_coupon = 0
eleven_per_coupon = 0
min_groceries = 500000
max_groceries = 0
min_discount = 5000000
max_discount = 0

while True:
    amount = input("Cost of groceries: ")
    coupon = 0
    if amount.lower() == "e":
        break
    if valid_datatype(amount):
        amount = int(amount)
        if amount < min_groceries:
            min_groceries = amount
        if amount > max_groceries:
            max_groceries = amount
        total_amount += amount
    if not valid_datatype(amount):
        print("Wrong data type")
    elif amount <= 0:
        print("Cost of groceries should be greater than £0")
    elif amount < 10:
        print("Less than £10 (No coupon)")
        no_coupon += 1
    elif amount <= 60:
        coupon = amount * 8 / 100
        print(f"Awarded a discount coupon of £{coupon} (8% of purchase)")
        total_discount += coupon
        eight_per_coupon += 1
    elif amount <= 150:
        coupon = amount * 9 / 100
        print(f"Awarded a discount coupon of £{coupon} (9% of purchase)")
        total_discount += coupon
        nine_per_coupon += 1
    elif amount <= 210:
        print(f"Awarded a discount coupon of £{coupon} (10% of purchase)")
        coupon = amount * 10 / 100
        total_discount += coupon
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                ten_per_coupon += 1
        else:
            coupon = amount * 11 / 100
            if coupon > 33:
                coupon = 33
                print(f"Awarded a discount coupon of £{coupon} (capped)")
                total_discount += 33
            else:
                print(f"Awarded a discount coupon of £{coupon} (11% of purchase)")
                total_discount += coupon
            eleven_per_coupon += 1
    if coupon > max_discount:
        max_discount = coupon
    if coupon < min_discount:
        min_discount = coupon
print(f"\nTotal groceries: {total_amount}\nTotal discount: {total_discount}\n"
+ f"Groceries - discount: {total_amount - total_discount}\n")


print(f"Minimum groceries: {min_groceries}\nMaximum groceries: {max_groceries}"
+ f"\nMinimum coupon: {min_discount}\nMaximum coupon: {max_discount}")


customers = no_coupon + eight_per_coupon + nine_per_coupon + ten_per_coupon + eleven_per_coupon

print("\nHistogram")
print("<£10 (0%)        : " + ("*" * no_coupon))
print("£10-£60 (8%)     : " + ("*" * eight_per_coupon))
print("£61-£150 (9%)    : " + ("*" * nine_per_coupon))
print("£151-£210 (10%)  : " + ("*" * ten_per_coupon))
print(">£211 (11%/Cap)  : " + ("*" * eleven_per_coupon))

print("\n" + f"{customers} customers")

print("\n0%   8%   9%   10%  11%")
while True:
    if no_coupon > 0:
        print(" *   ", end="")
        no_coupon -= 1
    else:
        print("     ", end="")

    if eight_per_coupon > 0:
        print(" *   ", end="")
        eight_per_coupon -= 1
    else:
        print("     ", end="")

    if nine_per_coupon > 0:
        print(" *   ", end="")
        nine_per_coupon -= 1
    else:
        print("     ", end="")

    if ten_per_coupon > 0:
        print(" *   ", end="")
        ten_per_coupon -= 1
    else:
        print("     ", end="")

    if eleven_per_coupon > 0:
        print(" *   ")
        eleven_per_coupon -= 1
    else:
        print("     ")

    if no_coupon <= 0 and eight_per_coupon <= 0 and nine_per_coupon <= 0 and ten_per_coupon <= 0 and eleven_per_coupon <= 0:
        break

#TaskE
def valid_datatype(amount):
    try:
        amount = int(amount)
        return True
    except:
        return False


list = [10, 14, 58, 62, 200, 8, 512]

total_amount = 0
total_discount = 0
no_coupon = 0
eight_per_coupon = 0
nine_per_coupon = 0
ten_per_coupon = 0
eleven_per_coupon = 0
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for amount in list:
    if valid_datatype(amount):
        amount = int(amount)
        total_amount += amount
    if not valid_datatype(amount):
        print("Wrong data type")
    elif amount <= 0:
        print("Cost of groceries should be greater than £0")
    elif amount < 10:
        print("Less than £10 (No coupon)")
        no_coupon += 1
    elif amount <= 60:
        print(f"Awarded a discount coupon of £{amount * 8 / 100} (8% of purchase)")
        total_discount += (amount * 8 / 100)
        eight_per_coupon += 1
    elif amount <= 150:
        print(f"Awarded a discount coupon of £{amount * 9 / 100} (9% of purchase)")
        total_discount += (amount * 9 / 100)
        nine_per_coupon += 1
    elif amount <= 210:
        print(f"Awarded a discount coupon of £{amount * 10 / 100} (10% of purchase)")
        total_discount += (amount * 10 / 100)
        ten_per_coupon += 1
    else:
        amount = amount * 11 / 100
        if amount > 33:
            amount = 33
            print(f"Awarded a discount coupon of £{amount} (capped)")
            total_discount += 33
        else:
            print(f"Awarded a discount coupon of £{amount} (11% of purchase)")
            total_discount += amount
        eleven_per_coupon += 1

print(f"\nTotal groceries: {total_amount}\nTotal discount: {total_discount}\n"
+ f"Groceries - discount: {total_amount - total_discount}\n")

customers = no_coupon + eight_per_coupon + nine_per_coupon + ten_per_coupon + eleven_per_coupon

print("Histogram")
print("<£10 (0%)        : " + ("*" * no_coupon))
print("£10-£60 (8%)     : " + ("*" * eight_per_coupon))
print("£61-£150 (9%)    : " + ("*" * nine_per_coupon))
print("£151-£210 (10%)  : " + ("*" * ten_per_coupon))
print(">£211 (11%/Cap)  : " + ("*" * eleven_per_coupon))

print("\n" + f"{customers} customers")
```