



Polytechnic Tutoring Center

Exam 1 Review - CS 1114, Fall 2020

Disclaimer: This mock exam is only for practice. It was made by tutors in the Polytechnic Tutoring Center and is not representative of the actual exam given by the CS Department.

- 1** Given these assignments: **a = 5**, **b = 2**, and **s = 1.5** write the type and value of the following expressions. Circle **ERROR** if the expression will result in a run time error.

Statement:	Type:	Value:	ERROR:
<code>a / b</code>	<u>float</u>	<u>2.5</u>	ERROR
<code>b ** a</code>	<u>int</u>	<u>32</u>	ERROR
<code>float(a) / b</code>	<u>float</u>	<u>2.5</u>	ERROR
<code>a % b</code>	<u>int</u>	<u>1</u>	ERROR
<code>s // a</code>	<u>float</u>	<u>0.0</u>	ERROR
<code>a > b</code>	<u>bool</u>	<u>True</u>	ERROR
<code>a == b</code>	<u>bool</u>	<u>False</u>	ERROR
<code>a // b</code>	<u>int</u>	<u>2</u>	ERROR
<code>a + b * a</code>	<u>int</u>	<u>15</u>	ERROR

ANSWER KEY

2 Conversion between binary, decimal and hexadecimal numbers:

a. Convert the binary number 11101011 to decimal: _____ **235** _____

b. Convert the decimal number 151 to binary: ___ **10010111** ___

c. Convert the binary number 10011100 to hexadecimal: _____ **9C** _____

d. Convert the hexadecimal number 5F to binary: _____ **1011111** _____ (please show all 8 binary digits)

e. Convert the decimal number 90 to hexadecimal: _____ **5A** _____

3 What is the output from the following code if the user enters 75?

```
c = int(input('Enter a value: '))
if c > 100:
    print("A")
elif c > 50:
    if c % 5 == 0 and not(c % 10 == 0):
        print("B")
    elif c % 5 == 0:
        print("C")
    else:
        print("D")
if c > 20:
    print("E")
else:
    print("F")
```

Your answer: **BE**

ANSWER KEY

- 4 What is the output from the following code?

```
acc = 0
for i in range(5,15,5):
    var = i;
    while var > 0:
        var //= 2;
        acc += var;
        print("i=",i," var=",var);
print("acc=",acc);
```

Your answer:

i=5 var=2

i=5 var=1

i=5 var=0

i=10 var=5

i=10 var= 2

i=10 var=1

i=10 var=0

acc=11

- 5 Write a program that prompts for radius length. Your program should calculate and print the resulting circumference and area of a circle with that radius. You must also check that the given radius is **positive**. Otherwise, print an error message and do not carry out the calculations. Use $\pi = 3.14$ for this question rather than importing math module.

Code:

ANSWER KEY

```
def main():  
    radius = float(input('Enter a radius: '))  
    pi = 3.14  
    if radius > 0:  
        circumference = 2 * pi * radius  
        area = pi * (radius ** 2)  
        print('Circumference: {}, Area: {}'.format(circ, area))  
    else:  
        print('ERROR: Radius must be positive')
```

- 6 Write a program that prompts a row number and print out the pattern in a zig-zag way. If the leading number of the row is odd, the row displays numbers in a decreasing sequence, starting from the leading number to 1. If the leading number of the row is even, the row displays numbers in an increasing sequence, starting from 1 to the leading number. Assume the input is always a valid positive integer.

Code:

Solution #1: Using for loop

```
row = int(input("Enter # of row: "))  
for i in range (row, 0, -1):  
    if i % 2 == 0:  
        for j in range(1, i+1):  
            print(j, end = " ")  
    else:  
        for j in range(i, 0, -1):  
            print(j, end = " ")  
print()
```

ANSWER KEY

Solution #2: Using while loop

```
row = int(input("Enter # of row: "))

while row != 0:

    if row % 2 == 0:

        temp_row = 1

        while temp_row <= row:

            print(temp_row, end = " ")

            temp_row += 1

    else:

        temp_row = row

        while temp_row != 0:

            print(temp_row, end = " ")

            temp_row -= 1

    print()

    row -= 1
```

- 7 Given a positive integer number, write a program to print the total number of times each digit. Write a program that prompts the user to enter a sequence of positive integers where each integer represents how many hours the employee worked in a day this week. When the user enters a negative integer, there are no more days to input. However, since there is a maximum of 7 days in a week, so at most you can take inputs for 7 times. The program should then print out (a) the employee's bonus pay for that week; (b) the employee's overtime pay for that week; and (c) the employee's total pay for that week. (In the following examples, payRate is 10.0.)

The rules governing an employee's pay are as follows:

- a. Each employee has an hourly pay rate, which we will call `payRate`. An employee is paid `payRate` dollars for every hour worked. `payRate` is a variable defined for you in advance; you should directly use it instead of defining it or read it in.

ANSWER KEY

- b. If an employee works more than 10 hours in a single day, they must be paid an additional *bonus* of \$13 for each such day.
- c. If an employee works a total of more than 40 hours in a single week, any hours over 40 will be paid at an *overtime* rate of one-and-a-half times their usual hourly wage. Hours under 40 will be paid at the usual rate. For example, if an employee has a normal rate of \$10 per hour and works 45 hours in a single week, they will be paid $\$10 \times 40 = \400 for the first 40 hours, then an additional overtime of $1.5 \times \$10 \times 5 = \75 for the remaining 5 hours, for a total pay of \$475.

The formatting and number of decimal places output in your calculations are not taken into account in grading your work.

Code:

```
WEEKDAY_NUM = 7
REG_W_HOUR = 40
REG_D_HOUR = 10
BONUS_PAY = 13.0
OVERTIME_RATE = 1.5
day_hour = int(input("Enter the hours worked:\n"))
total_hours = bonus_num = 0
day_count = 1
while day_hour >= 0:
    if day_hour > REG_D_HOUR:
        bonus_num += 1
    total_hours += day_hour
    day_count += 1
    if day_count > WEEKDAY_NUM: break
    day_hour = int(input())
if total_hours > REG_W_HOUR:
    overtime_pay = (total_hours - REG_W_HOUR) * OVERTIME_RATE * payRATE
```

ANSWER KEY

```
bonus_pay = bonus_num * BONUS_PAY

total = REG_W_HOUR * payRATE + overtime_pay + bonus_pay

else:

    overtime_pay = 0.0

    bonus_pay = bonus_num * BONUS_PAY

    total = total_hours * payRATE + bonus_pay

print("Bonus Pay: $", round(bonus_pay,2))

print("Overtime Pay: $", round(overtime_pay,2))

print("Total Pay: $", round(total,2))
```