

Computer Programming C++ Midterm Practice 2019/10/9

Problem 1: Ask the user to input two non-negative numbers M and N, representing a taxi trip for M km and N min idle minutes. (You may ask the user to input one at a time.) If M and N are negative numbers, ask the user to input for up to 3 times. Properly display the taxi fair (計程車費). The taxi fair is calculated as following: 70 dollars for the first 1.25 km, and 5 dollars for the following 0.25 km or less. 5 dollars for each 2 min idle time; there is no extra charge for less than 2 min.

Problem 2: Create a function that displays input (x) and output (y) for the following:

$$y=x \text{ for } x<1 \text{ or } x>10$$

$$y=\sin(x)*\cos(2x) \text{ for } 1\leq x<5$$

$$y=\cos(2x) \text{ for } 10\geq x\geq 5$$

Problem 3: Calculate $2*4*6+4*6*8+6*8*10+\dots+200*202*204$.

Problem 4: Find the real roots for $x^3+2x^2+6x+1=0$

Problem 5: Display the following words:

Welcome to NTU ChE!!

I am "NTUChER."

Problem 6: Write a C++ code that does the following:

- (i) Ask the user to input a positive integer n, if the input is zero or negative integer, display "Invalid input", then ask the user to input it again, until a positive integer is input.
- (ii) If the user input is a positive integer n, display " $n*(n+1)=$ " $n*(n+1)$

Problem 7: Create the following functions:

Fun1: the input and output are x and y, respectively, for $y=x*\exp(-x)+3$

Fun2: the input and output are x0 and h, find the 2nd derivative of the Fun1 ($y''(x_0)$) with $\Delta x=h$.

Problem 8: Find and display all numbers between 100 and 110 that can be divided into the sum of the square of three positive integers: $N=a^2+b^2+c^2$ (eg. $9=1^2+2^2+2^2$) with $a \geq b \geq c$.