

Homework #1
Due by Friday 9/15 11:55pm

Submission instructions:

1. You should submit your homework in the NYU Classes system.
2. For this assignment you should turn in 4 files:
 - A '.pdf' file with your answers for questions 1-5.
Make sure to include the conversion calculations, not just the final answer.
Name your file 'YourNetID_hw1_q1to5.pdf'
 - Three '.cpp' files, one containing a program for question 6, one for question 7 and one for question 8.
Name your files 'YourNetID_hw1_q6.cpp', 'YourNetID_hw1_q7.cpp' and 'YourNetID_hw1_q8.cpp' respectively.

Question 1:

A. Convert the following numbers to their decimal representation:

1. $10011011_2 =$
2. $456_7 =$
3. $38A_{16} =$
4. $2214_5 =$

B. Convert the following numbers to their binary representation:

1. $69_{10} =$
2. $485_{10} =$
3. $6D1A_{16} =$

C. Convert the following numbers to their hexadecimal representation:

1. $1101011_2 =$
2. $895_{10} =$

Question 2:

Solve the following, do all calculation in the given base:

1. $7566_8 + 4515_8 =$
2. $10110011_2 + 1101_2 =$
3. $7A66_{16} + 45C5_{16} =$
4. $3022_5 - 2433_5 =$

Question 3:

A. Convert the following numbers to their 8-bits two's complement representation:

1. $124_{10} =$
2. $-124_{10} =$
3. $109_{10} =$
4. $-79_{10} =$

B. Convert the following numbers (represented as 8-bit two's complement) to their decimal representation:

1. $00011110_{8 \text{ bit 2's comp}} =$
2. $11100110_{8 \text{ bit 2's comp}} =$
3. $00101101_{8 \text{ bit 2's comp}} =$
4. $10011110_{8 \text{ bit 2's comp}} =$

Question 4:

Let p , q , and r be the propositions:

p : You get an A on the final exam.

q : You do every homework assignment.

r : You get an A in this class.

Write the following propositions using p , q , and r and logical connectives

1. You get an A in this class, but you do not do every homework assignment.
2. You get an A on the final, you do every homework assignment, and you get an A in this class.
3. To get an A in this class, it is necessary for you to get an A on the final.
4. You get an A on the final, but you don't do every homework assignment; nevertheless, you get an A in this class.
5. Getting an A on the final and doing every homework assignment is sufficient for

getting an A in this class.

6. You will get an A in this class if and only if you either do every homework assignment or you get an A on the final.

Question 5:

Show that $(p \rightarrow q) \wedge (p \rightarrow r)$ and $p \rightarrow (q \wedge r)$ are logically equivalent.

Question 6:

Write a program that asks the user to enter a number of quarters, dimes, nickels and pennies and then outputs the monetary value of the coins in the format of dollars and remaining cents.

Your program should interact with the user **exactly** as it shows in the following example:

Please enter number of coins:

of quarters: 13

of dimes: 4

of nickels: 11

of pennies: 17

The total is 4 dollars and 37 cents

Question 7:

Write a program that asks the user to enter an amount of money in the format of dollars and remaining cents. The program should calculate and print the minimum number of coins (quarters, dimes, nickels and pennies) that are equivalent to the given amount.

Hint: In order to find the minimum number of coins, first find the maximum number of quarters that fit in the given amount of money, then find the maximum number of dimes that fit in the remaining amount, and so on.

Your program should interact with the user **exactly** as it shows in the following example:

Please enter your amount in the format of dollars and cents separated by a space:

4 37

4 dollars and 37 cents are:

17 quarters, 1 dimes, 0 nickels and 2 pennies

Question 8:

Suppose John and Bill worked for some time and we want to calculate the total time both of them worked. Write a program that reads number of days, hours, minutes each of them worked, and prints the total time both of them worked together as days, hours, minutes.

Hint: Try to adapt the elementary method for addition of numbers to this use.

Your program should interact with the user **exactly** as it shows in the following example:

Please enter the number of days John has worked: 2

Please enter the number of hours John has worked: 12

Please enter the number of minutes John has worked: 15

Please enter the number of days Bill has worked: 3

Please enter the number of hours Bill has worked: 15

Please enter the number of minutes Bill has worked: 20

The total time both of them worked together is: 6 days, 3 hours and 35 minutes.