

Homework 1

COMPSCI 101, Duke Kunshan University

Name:

NetID:

```
In [1]: # Put your answer in here for easier grading
# Q1, ans =11001.11101
# Q2, ans =110010
# Q3 (1), ans =6635520000
# Q3 (2), ans =10616.832
# Q4, ans =55.625
```

Q1 (10 points)

Convert the decimal fraction 25.90625 to a binary

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In [2]: #Please place your final answer in the first cell at the very top and clearly show all calculation steps be
25.90625*2=51.8125
51.8125*2=103.625
103.625*2=207.25
207.25*2=414.5
total:2^5
(829)10=(1100111101)2
414  1
207  0
103  1
51   1
25   1
12   1
6    0
3    0
1    1
so:1100111101/100000=11001.11101
```

Q2 (10 points)

Calculate the result of 01101001 – 00110111

```
In [3]: #Please place your final answer in the first cell at the very top and clearly show all calculation steps be
01101001
-00110111
110010
test:110010+110111=1101001
```

Q3 (10 points)

- (1) Calculate the file size (in Bytes!) of a 2-minute video recorded at 60 frames per second, where each frame has a resolution of 640 × 480 pixels, and each pixel contains 24 bits (RGB) of color information. Your answer should be in Bytes._
- (2) How long does it take to transmit this video with a transmission speed of 5 Mbps? Your answer should be in seconds.

In [4]:

```
#Please place your final answer in the first cell at the very top and clearly show all calculation steps below
(1) 60*120*640*480*24/8=6635520000
(2) 6635520000*8/(5*10^6)=10616.832
```

Q4 (10 points)

Convert the binary number 11011.1101 to its decimal equivalent.

In [5]:

```
#Please place your final answer in the first cell at the very top and clearly show all calculation steps below
(11011.1101)2=(110111101)2/(1000)2
(110111101)2=1+4+8+16+32+128+256=445
(1000)2=8
445/8=55.625
```