CS1010

https://github.com/DigiPie/cs1010_tut_c09

Today's plan

- Tutorial Segment
  - *Kahoot Quiz!*
  - *Discussion of problem sets 8 to 9*
  - *Coding Style demonstration*
- Lab Segment
  - *Exercises 1 & 2*

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Kahoot!

Today's plan

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  - *Discussion of problem sets 8 to 9*
  - *Coding Style demonstration*
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  - *Exercises 1 & 2*

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PROBLEM SETS

8.1, 8.2, 8.3, 9.1, 9.2, 9.3

Problem Set 8.1a)

Do the following two functions behave the same way?

```
long factorial(long n)
{
  if (n == 0) {
    return 1;
  }
  return n * factorial(n - 1);
}
```

```
long factorial(long n)
{
  if (n == 0) {
    return 1;
  } else {
    return n * factorial(n - 1);
  }
}
```


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Problem Set 8.1b)

Do the following two functions behave the same way?

```
long factorial(long n)
{
  long results;
  if (n == 0) {
    results = 1;
  }
  results = n * factorial(n - 1);
  return results;
}
```

```
long factorial(long n)
{
  long results;
  if (n == 0) {
    results = 1;
  } else {
    results = n * factorial(n - 1);
  }
  return results;
}
```


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PROBLEM SETS

8.1, 8.2, 8.3, 9.1, 9.2, 9.3

Problem Set 8.2

Draw the flow charts for the coding snippets below

```
if (x > y) {
  max = x;
}
if (x < y) {
  max = y;
}
if (x == y) {
  max = y;
}
```

```
if (x > y) {
  max = x;
} else {
  max = y;
}
```


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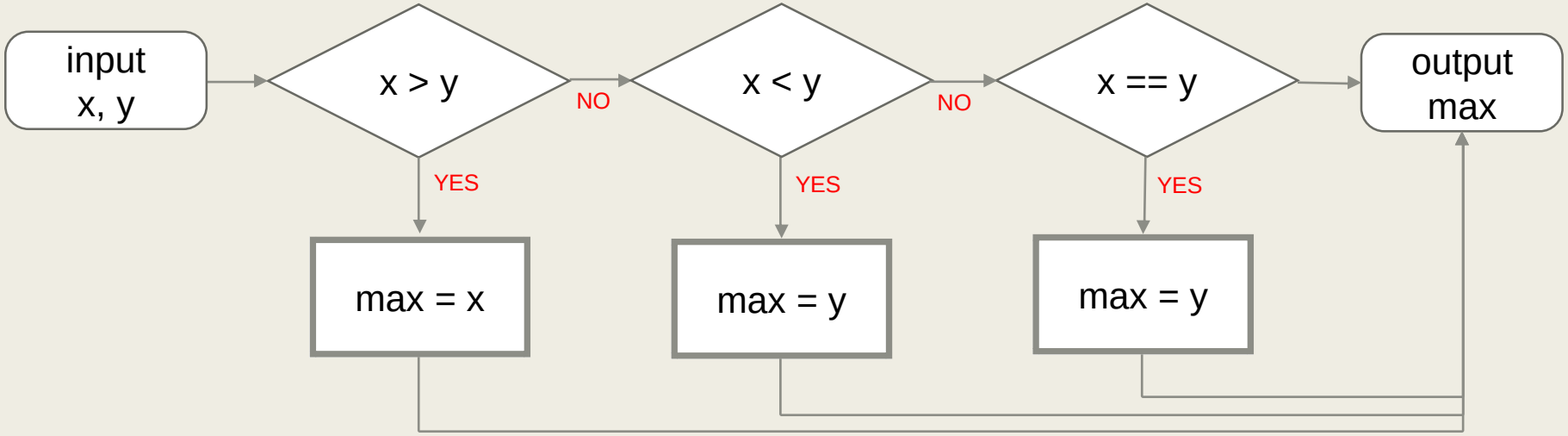
Problem Set 8.2

Draw the flow charts for the coding snippets below

```
if (x > y) {
  max = x;
}
if (x < y) {
  max = y;
}
if (x == y) {
  max = y;
}
```



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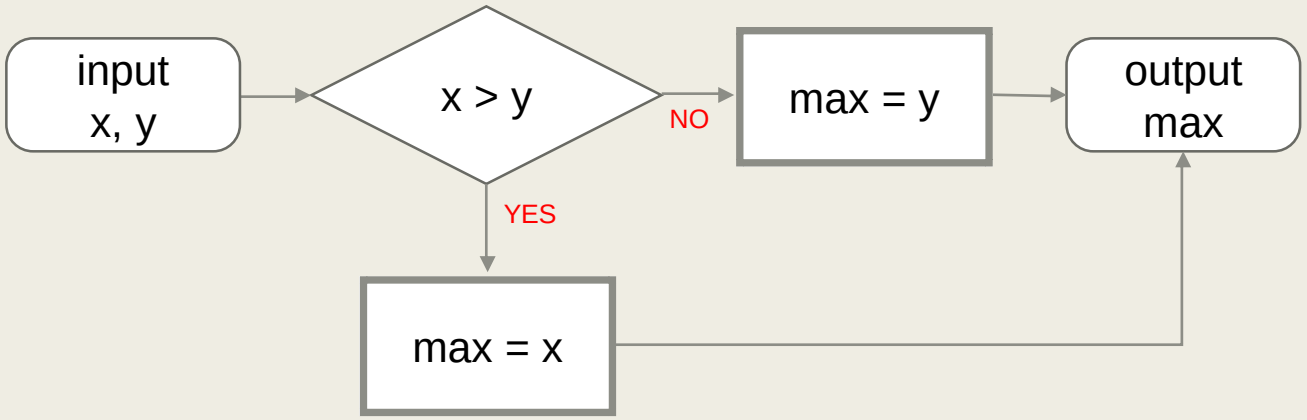
Problem Set 8.2

Draw the flow charts for the coding snippets below

```
if (x > y) {
  max = x;
} else {
  max = y;
}
```



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PROBLEM SETS

8.1, 8.2, 8.3, 9.1, 9.2, 9.3

Problem Set 8.3

Write the corresponding if-else statements to print out the letter grade based on the tables above.

Table 2

Score	Letter Grade
5 or higher	See Table 3
Less than 5	See Table 4

Table 3 (5 or higher)

Score	Letter Grade
8 or higher	A
Less than 8	B

Table 4 (less than 5)

Score	Letter Grade
3 or higher	C
Less than 3	D

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Problem Set 8.3

```
1  if (score >= 5) {
2      // table 3
3      if (score >= 8) {
4          // A
5      } else {
6          // B
7      }
8  } else {
9      // table 4
10     if (score >= 3) {
11         // C
12     } else {
13         // D
14     }
15 }
```

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PROBLEM SETS

8.1, 8.2, 8.3, 9.1, 9.2, 9.3

Problem Set 9.1

Fill in the table below.

a	b	a && b	a || b	!a
true	true			
true	false			
false	true			
false	false			

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Problem Set 9.1

Fill in the table below.

a	b	a && b	a || b	!a
true	true	**true**	**true**	**false**
true	false	**false**	**true**	**false**
false	true	**false**	**true**	**true**
false	false	**false**	**false**	**true**

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PROBLEM SETS

8.1, 8.2, 8.3, 9.1, 9.2, 9.3

Problem Set 9.2

a) What is wrong with the code above?

b) Give a sample test value of a, b, and c that would expose the bug.

```
1  long max_of_three(long a, long b, long c)
2  {
3    long max = 0;
4    if ((a > b) && (a > c)) {
5      // a is larger than b and c
6      max = a;
7    }
8    if ((b > a) && (b > c)) {
9      // b is larger than a and c
10     max = b;
11   }
12   if ((c > a) && (c > b)) {
13     // c is larger than a and b
14     max = c;
15   }
16   return max;
17 }
```


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Problem Set 9.2

a) What is wrong with the code above?

No check for equality. What if a == b?

b) Give a sample test value of a, b, and c that would expose the bug.

a == b == c

```
1  long max_of_three(long a, long b, long c)
2  {
3    long max = 0;
4    if ((a > b) && (a > c)) {
5      // a is larger than b and c
6      max = a;
7    }
8    if ((b > a) && (b > c)) {
9      // b is larger than a and c
10     max = b;
11   }
12   if ((c > a) && (c > b)) {
13     // c is larger than a and b
14     max = c;
15   }
16   return max;
17 }
```


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Problem Set 9.2

b) continued...
What if there is a tie among two numbers to be the max? (e.g., 2 2 1)

```
1   long max_of_three(long a, long b, long c)
2   {
3     long max = 0;
4     if ((a > b) && (a > c)) {
5       // a is larger than b and c
6       max = a;
7     }
8     if ((b > a) && (b > c)) {
9       // b is larger than a and c
10      max = b;
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12    if ((c > a) && (c > b)) {
13      // c is larger than a and b
14      max = c;
15    }
16    return max;
17  }
```


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Problem Set 9.2

b) continued...
What if there is a tie among two numbers to be the max? (e.g., 2 2 1)
Does not work as no assignment will happen.

```
1  long max_of_three(long a, long b, long c)
2  {
3    long max = 0;
4    if ((a > b) && (a > c)) {
5      // a is larger than b and c
6      max = a;
7    }
8    if ((b > a) && (b > c)) {
9      // b is larger than a and c
10     max = b;
11   }
12   if ((c > a) && (c > b)) {
13     // c is larger than a and b
14     max = c;
15   }
16   return max;
17 }
```


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Problem Set 9.2

b) continued...
What if the two numbers that is not the max are equal? (e.g., 2 1 1).

```
1   long max_of_three(long a, long b, long c)
2   {
3     long max = 0;
4     if ((a > b) && (a > c)) {
5       // a is larger than b and c
6       max = a;
7     }
8     if ((b > a) && (b > c)) {
9       // b is larger than a and c
10      max = b;
11    }
12    if ((c > a) && (c > b)) {
13      // c is larger than a and b
14      max = c;
15    }
16    return max;
17  }
```


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Problem Set 9.2

b) continued...
What if the two numbers that is not the max are equal? (e.g., 2 1 1).
Works as assignment still happens.

```
1   long max_of_three(long a, long b, long c)
2   {
3     long max = 0;
4     if ((a > b) && (a > c)) {
5       // a is larger than b and c
6       max = a;
7     }
8     if ((b > a) && (b > c)) {
9       // b is larger than a and c
10      max = b;
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12    if ((c > a) && (c > b)) {
13      // c is larger than a and b
14      max = c;
15    }
16    return max;
17  }
```


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Problem Set 9.2

(c) Fix the code above to remove the bug.

```
1  long max_of_three(long a, long b, long c)
2  {
3    long max = 0;
4    if ((a > b) && (a > c)) {
5      // a is larger than b and c
6      max = a;
7    }
8    if ((b > a) && (b > c)) {
9      // b is larger than a and c
10     max = b;
11   }
12   if ((c > a) && (c > b)) {
13     // c is larger than a and b
14     max = c;
15   }
16   return max;
17 }
```


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Problem Set 9.2

```
1  long max_of_three(long a, long b, long c)
2  {
3    long max = 0;
4    if ((a >= b) && (a >= c)) {
5      // a is larger than b and c
6      max = a;
7    }
8    if ((b >= a) && (b >= c)) {
9      // b is larger than a and c
10     max = b;
11   }
12   if ((c >= a) && (c >= b)) {
13     // c is larger than a and b
14     max = c;
15   }
16   return max;
17 }
```

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Problem Set 9.2

(d) Replace the three if statements in the code above with if-else statements. Draw the corresponding flowchart.

```
1  long max_of_three(long a, long b, long c)
2  {
3    long max = 0;
4    if ((a >= b) && (a >= c)) {
5      // a is larger than b and c
6      max = a;
7    }
8    if ((b >= a) && (b >= c)) {
9      // b is larger than a and c
10     max = b;
11   }
12   if ((c >= a) && (c >= b)) {
13     // c is larger than a and b
14     max = c;
15   }
16   return max;
17 }
```


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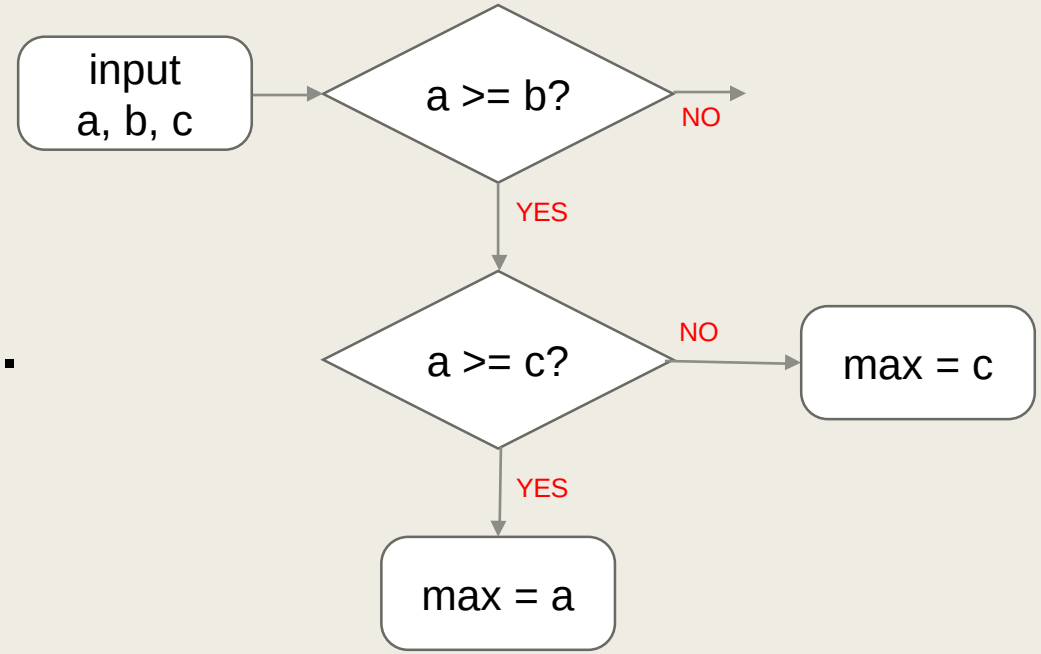
(d) Replace the three if statements in the code above with if-else statements. Draw the corresponding flowchart.



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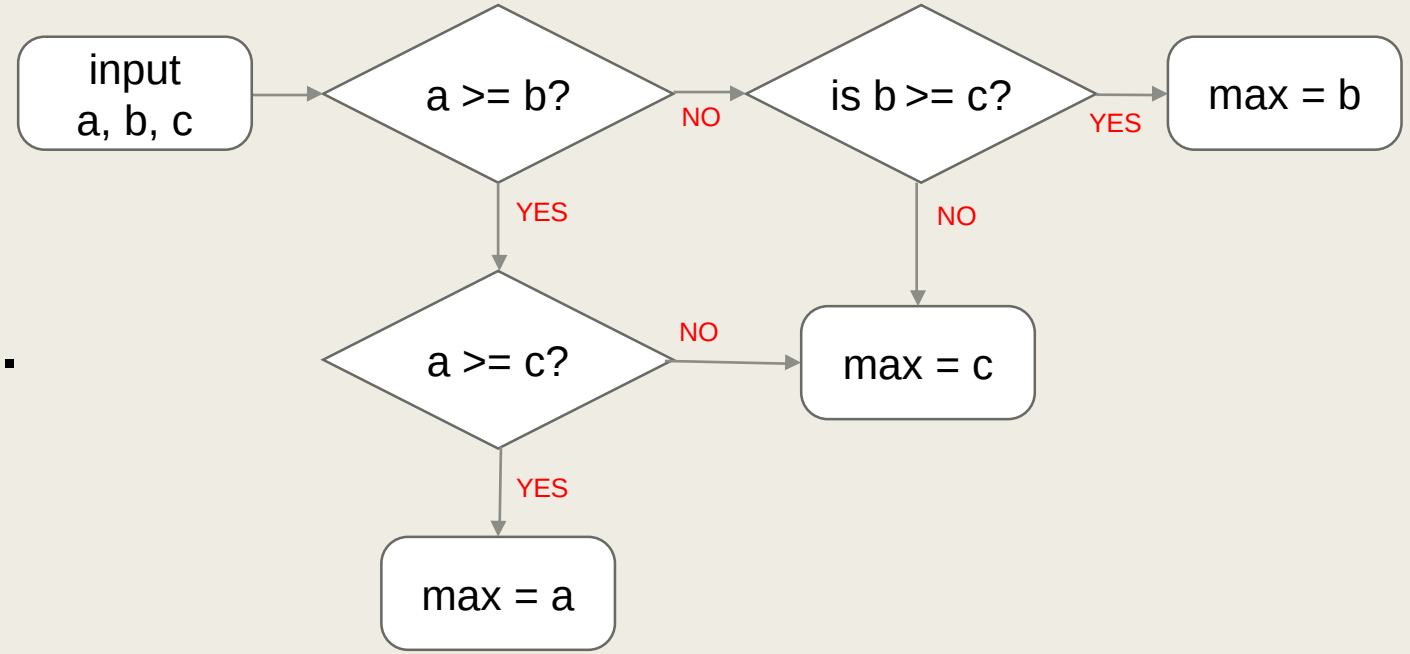
Problem Set 9.2

(d) Replace the three if statements in the code above with if-else statements. Draw the corresponding flowchart.



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Problem Set 9.2

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```
1   long max_of_three(long a, long b, long c)
2   {
3     long max = 0;
4     if (a >= b) {
5       if (a >= c) {
6         max = a;
7       } else {
8         max = c;
9       }
10    } else if (b >= c) {
11      max = b;
12    } else {
13      max = c;
14    }
15    return max;
16  }
```

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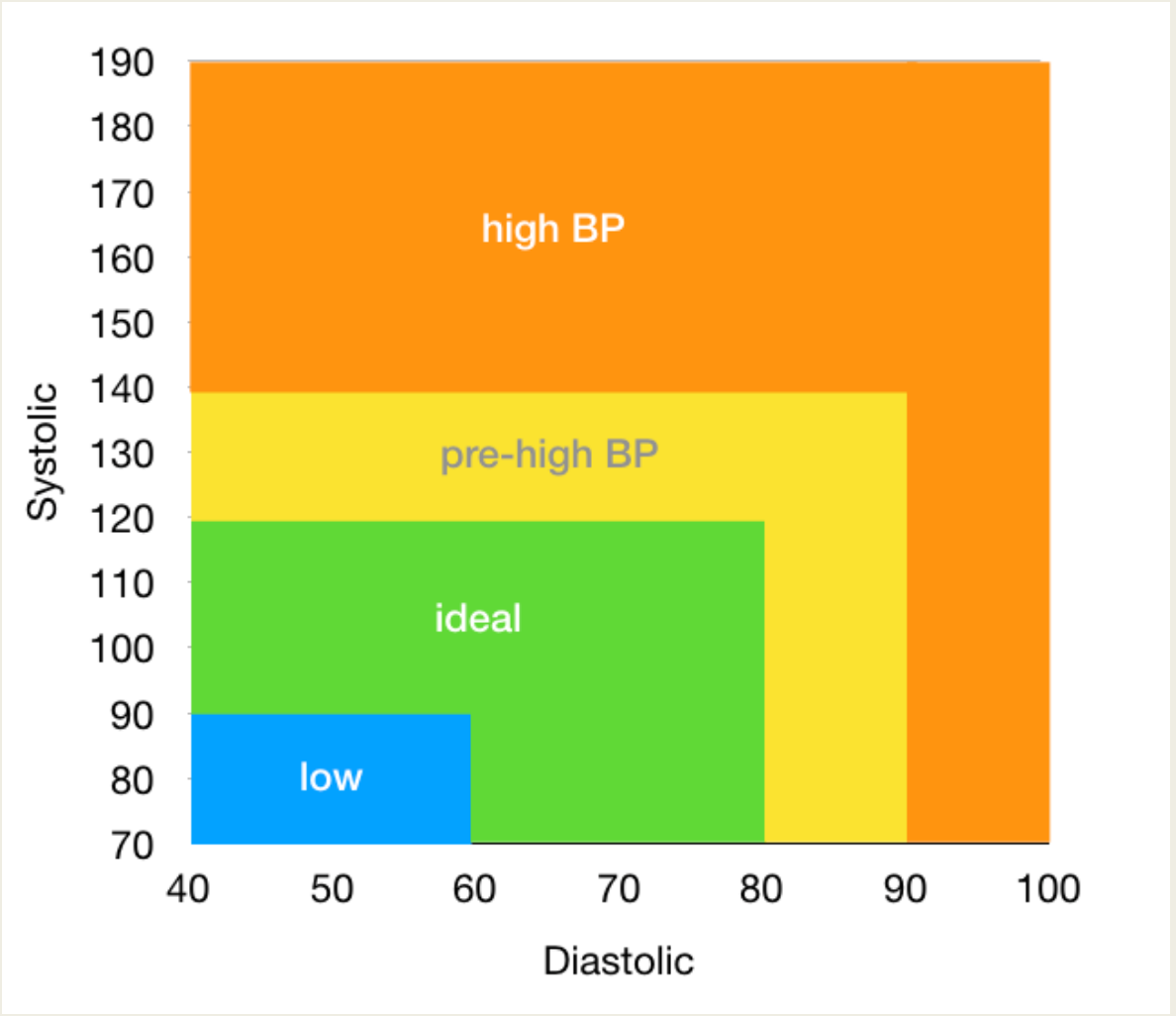
Problem Set 9.3



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  - *Exercise 1 & 2*

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CODING STYLE DEMO

https://nus-cs1010.github.io/1819-s1/style/index.html

THE END

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