Warmup January 9th, 2018

What is the value of the following C expression?

```
8*9 % 10/2
```

Warmup January 11th, 2018

What is the value of the following C expression?

```
(-42 || 3 != 3) && (-3 < -2 < -1)
```

Warmup January 16th, 2018

What is printed to the screen?

```
printf("Wow! %d + %d = %d + %d",
  2 == 3, 17/3, 1 && (2 != 3 || 4 < -10),
  1+1+1*2);
```

Warmup January 18th, 2018

What is printed to the screen? What is the value of y?

```
int x=3;
int y=4;
y *= x;
x = 5;
y = printf("%d",y);
```

Warmup January 23rd, 2018

What is printed to the screen?

```
#include <stdio.h>
int main(void) {
  int x = 5, y = 3;
  int ans = 0;
  if (x > y)
    ans = y - x;
  else if (x == 5)
    ans = y;
  else
    ans = 100;
  printf("%d\n",ans);
  return 0;
}
```

Clicker

What is printed to the screen?

```
#include <stdio.h>
int main(void) {
  int x = 6, y = 3;
  int ans = 0;
  if (x > y)
    ans = 10;
  if (x == 5)
    ans -= 1;
  else
    ans += 1;
  printf("%d\n",ans);
  return 0;
}
```

a) -1
b) 1
c) 9
d) 10
e) 11

Warmup January 30th, 2018

Carmen: Reminder - Assignment 3.

What is printed to the screen?

```
#include <stdio.h>
void swap(int a, int b){
   int t = a;
   a = b;
   b = t;
}

int main(void) {
   int x = 5, y = 3;
   swap(x,y);
   printf("%d %d \n", x, y);
}
```

Warmup February 1st, 2018

Carmen: Reminder - Assignment 3.

Draw the stack frame (Yes with paper and pen/pencil!) for the following. Cross out any popped stack elements. Stop when you finish the starred line.

```
int gab(int t, int u){
  int c = t*u;
  return c+1;
}
int fun(int a, int b){
  if (b==3) return fun(a,2);
  return a + b + gab(a-b, b);
}
int main(void) {
  int x = 5, y = 3;
  int k = fun(x,y); //***
  int z = 22;
}
```

Warmup February 6th, 2018

What is printed to the screen?

```
#include <stdio.h>
int main(void) {
   int a = 0, b = -1, z = -2;
   int *c = &z;
   int *d = c;
   b = a;
   a = 2;
   *c = 2;
   printf("%d %d",b, *d);
   return 0;
}
```

Warmup February 8th, 2018

What is printed to the screen?

```
#include <stdio.h>
int main(void) {
   int s=0, n=20;
   for(int i=1; i<n; i++){
      if(i%2==0) continue;
      if(i%7==0) break;
      s += i;
   }
   printf("%d\n",s);
   return 0;
}
```

Returning a Function Pointer

```
#include <stdio.h>
#include <stdbool.h>
int my_add(int x, int y){
  return x + y;
}
int my_sub(int x, int y){
  return x - y;
}
int (*pick(bool add))(int, int) {
  if (add) return my_add;
  return my_sub;
}
int main(void) {
  printf("%d\n", pick(true)(3,5));
  return 0;
}
```

Don't forget

To show the visualizer!

Warmup February 13th, 2018

What is the difference between an interface file and an implementation file? Which would you show a client? Which would you modify for maintainability or efficiency purposes?

Warmup February 15th, 2018

Please fill out the midterm feedback survey! Extra surveys are at the end of the middle rows!

Warmup February 27th, 2018

List the values of the array.

```
#include <stdio.h>
int main(void) {
   int a[] = {3,5,7,11,13,17,19,23};
   int *b = a;
   int *c = a + 4;
   a[2] = c[1] + b[0];
   *(c+1) = *(a+2) * *b;
   for(int *p = a; p < c; p++)
      *a +=2;
}
```

Warmup March 1st, 2018

What is the value of $p[3]$ after the following code is run?

```
int p[5] = {0,1,2,3,4};
int *q=&p[1];
q[1] += 2;
q[0] = q[3];
p[2] += q[2] + q[0];
p[3] -= q[1]/6;
```

Warmup March 6th, 2018

What is the runtime of the following algorithm?

```
int sum=0;
for(int i=0; i < n; i++){
  for(int j=0; j < n; j+=2){
    sum += i*j;
  }
}
```

Which of the following when true guarantees that $f(n) = O(g(n))$ (below C is a real constant)?

$$\lim_{n\to\infty} \frac{g(n)}{f(n)} = C \qquad \lim_{n\to\infty} \frac{f(n)}{g(n)} = C$$

$$\lim_{n\to\infty} f(n)g(n) = C \qquad \lim_{n\to\infty} f(n) + g(n) = C$$

Warmup March 8th, 2018

What is the runtime of the summing function?

```
int f(int n){
  int s=0;
  for(int i = 0; i < n; i++){
    s = s + 1;
  }
  return s;
}
int summing(int sum, int n){
  for(int i = 0; i < n; ++i){
     for(int j = 0; j < f(n); ++j){
       sum += i + j;
    }
  }
  return sum;
}
```

Warmup March 8th, 2018

What is the runtime of the summing function?

```
int f(int n){
  int s=0;
  for(int i = 0; i < n; i++){
    s = s + 1;
  }
  return s;
}
int summing(int sum, int n){
  for(int i = 0; i < f(n); ++i){
     for(int j = 0; j < n; ++j){
       sum += i + j;
    }
  }
  return sum;
}
```

Warmup March 8th, 2018

What is the runtime of the summing function?

```
int f(int n){
  int s=0;
  for(int i = 0; i < n; i++){
    s = s + 1;
  }
  return s;
}
int summing(int sum, int n){
  for(int i = 0; i < f(n); ++i){
      sum += i;
  }
  return sum;
}
```

Warmup March 13th, 2018

What is printed?

```
#include <string.h>
#include <stdio.h>
int main(void){
   char a[] = "banana";
   char b[] = "Zebra";
   char c[] = "1337 $p34k";
   char d[] = "Zebra";
   printf("%d",
   (strcmp(d,b)) ||
   (strcmp(a,b) < 0) ||
   (strcmp(b,c) > 0) );
   return 0;
}
```

Warmup March 15th, 2018

Answer the following questions

- What is the heap?
- How do you allocate memory to the heap?
- Who is responsible for deallocating memory on the heap?
- Who is responsible for deallocating memory on the stack?
- How does one deallocate memory from the heap?

Warmup March 20th, 2018

How many memory leaks are there below?

```
#include <stdlib.h>
int main(void){
  int *j = malloc(4);
  int *k = j;
  j = malloc(8);
  realloc(k,100);
  free(j);
}
```

Warmup March 22nd, 2018

What are some advantages to using the linked list wrapper structure?

Warmup March 24th and 26th, 2018

Fill out your Course Evaluations!

`https://evaluate.uwaterloo.ca/`

Warmup April 3rd, 2018

What is printed below?

```
#include <stdlib.h>
#include <stdio.h>
int main(void){
  int *p = malloc(10*sizeof(int));
  for(int *a = p; a < p + 10; a++){
    *a = (a-p)+1;
  }
  void *q = p + 3;
  printf("%d\n", *(int *)q * *(int *)q);
}
```

Warmup April 3rd, 2018

When do we want office hours?

1. Monday April 9th
2. Tuesday April 10th
3. Wednesday April 11th
4. Thursday April 12th
5. Friday April 13th

Warmup April 3rd, 2018

When do we want office hours?

1. Morning
2. Lunch
3. Afternoon