Practice Problems for Week 1

Operating and Systems Programming 2022/23

For all questions involving code, try to answer them *without* running the code first.

1. Consider the following pseudocode. Show how the cmoputation steps are executed on a von Neumann computer.

```
foo () {
   readIO a;
   readIO b;
   c = a + b;
   store c;
   d = a - b;
   print d;
}
```

2. With an example, explain the advantages of having registers inside the CPU.

3. How are pointer variables related to the memory of a cmoputer?

4. How are pointers and arrays related in C?

5. What does the following function perform?

```
void foo (int *px, int *py) {
   int temp;

   temp = *px;
   *px = *py;
   *py = temp;
}
```

6. What will be the output of this program?

```
int main () {
   float arr[5] = {12.5,10.0,13.5,90.5,0.5};
   float *ptr1 = &arr[0];
```

```
   float *ptr2 = ptr1 + 3;
   printf ("%f\n", *ptr2);
   printf ("%ld\n", ptr2 - ptr1);
   return 0;
}
```

7. What will be the output of this program?

```
int main () {
  int a[5] = {1,2,3,4,5};
  int *ptr = a+1;
  printf ("%d, %d\n", *(a+1), *(ptr-1));
  return 0;
}
```

8. How is the string "Hello World!" stored in the memory? How many bytes does this string consume in C?

9. What does the following function do with the two input string pointers?

```
void foo (char *s, char *t) {
    int i = 0;

    while ((s[i] = t[i]) != '\0') {
       i++;
    }
}
```

10. What does the following function do with the two input string pointers?

```
void foo (char *s, char *t) {
    while ((*s = *t) != '\0') {
       s++;
       t++;
    }
}
```