The George Washington University
School of Engineering and Applied Science
Department of Computer Science
CSci 4223 – Principles of Programming Languages – Spring 2018
Pointers Extra Practice
Instructor: A. Bellaachia

1. What is the output of the following code:

```
#include <stdio.h>

int main()
{
   int *myptr;
   int x;

   myptr = &x;
   *myptr = 0;

   printf(" x = %d\n", x);
   printf(" *myptr = %d\n", *myptr);

   *myptr += 5;
   printf(" x  = %d\n", x);
   printf(" *myptr = %d\n", *myptr);

   x += *myptr;
   printf(" x  = %d\n", x);
   printf(" *myptr = %d\n", *myptr);

   (*myptr)++;
   printf(" x = %d\n", x);
   printf(" *myptr = %d\n", *myptr);

   return 0;
}
```

2. What are the outputs of this code?

```
//gcc 5.4.0

#include <stdio.h>


int triple(int *x) {
   *x *= 3;
   return (1);
}

int main() {
   int y=1;
   int res=10;


   printf("Y Before: %d\n", y);
   printf("res  Before: %d\n", res);

   res = triple(&y);
   printf("y After: %d\n", y);
   printf("res After : %d\n", res);

   return 0;
}
```

3. What is the output of the following code?

```
//gcc 5.4.0

#include  <stdio.h>
#include <string.h>

int main(void) {
   int i, n;
   char *x = "girl";
   n = strlen(x);
   printf("%s\n",x);
   for(i=0; i<n;++i)
      printf("%c\n",x[i]);

}
```

4. What is the output of the following code?

```
#include  <stdio.h>
int main(void)
{
   char *p,*str,*str1;
   char s[]={'A', 'E', 'I', 'O', 'U','\0'};

   p=&s[3];

   str=p;

   str1=s;
   printf("%c\n",++*p );
   printf("%c\n",++*str1);
   printf("%d",++*p + ++*str1);

}
```

5. What it the output of the following code?

```
#include  <stdio.h>
int main(void)
{
   int myarr[ ]={20,80,300,400,14,16,99,88};

   int j,*p=myarr,*q=myarr+8;
   for(j=0;j<sizeof(myarr)/4;j++) {
      printf(" %d ", *(p+j));
   }

      p=myarr+sizeof(myarr)/4;

   printf("\n--------------------------------\n");

   for(j=0; j<sizeof(myarr)/4;j++){

      printf(" %d ", *(p-j-1));

   }
}
```

6. What is the output of the following code:

```
#include <stdio.h>

int change(int* pnumber)
{
  *pnumber *= 2;
  printf("\nWithin change function, *pnumber = %d\n", *pnumber );
  return *pnumber;
}

void main()
{
  int number = 20;
  int* pnumber = &number;
  int result = 0;

  printf("\nIn the main, Before calling the change function: result= %d\tnumber =
%d\t*pnumber = %d", result, number,*pnumber);
  result = change(pnumber);
  printf("\nIn the main after the call to the change function:, result= %d\tnumber =
%d\t*pnumber = %d", result, number,*pnumber);
}
```

7. Indicate the output of the following code fragment?

```
int num =0;
   for (num=1; num <= 30; num +=4){
      if (num % 3 == 0)
         printf("%d\n",num);
   }
```

How many numbers are printing? And how many times the loop iterates?

8. Complete the following code by answering the three comments inside the main function:

```
//gcc 5.4.0
#include <stdio.h>
 void main() {
    typedef struct {
        char c;
        float d;
     } mystruct;
    typedef struct {
        int a[3];
        char b;
        mystruct foo;
    } allstruct;

    // Create a variable of type allstruct

    // Initialize your variable with some values

    // Write a printf statement to print the values of your variable
}
```

9. Explain in one sentence what does this code do?

```
//gcc 5.4.0

#include <stdio.h>
int * mystery(int n)
{
    int *a;
    a = malloc(sizeof(int) * n);
    if(a == 0)
        printf("What happened?\n");
    return a;
}
int main() {
    int N = 10;
    int * a;
     a = mystery(N);
     return 0;
}
```

Ans: Create an array of size N.

10. What is the output of the following code?

```
//gcc 5.4.0
#include <stdio.h>
void anothermysteryArray(int n, int a[n]) {
   int i;
   int w;
   for(i = 0; i < (int)n/2; i++) {
      w = a[i];
      a[i] = a[n-i-1];
      a[n-i-1] = w;
   }

}

int main() {
   int N =10;
   int myarr[10] = {0, 11,33,44,55,66,77,88,99,111};
   anothermysteryArray(N,myarr);
   for(int i = 0; i < N; i++) {
      printf("----%d\n", myarr[i]);
   }
   return 0;
}
```

11. What is the return type of the function with the following prototype?

```
int func(char x, float v, double t);
```

12. Convert the following for loop statement to a while loop statement:

```
for(i = 0; i < 10; i++) {
        printf("%d\n", i);
}
```

13. We would like to write a C program that declares a strcture to represent the information of a vehicle. A vehicle can be described by the following attributes:

- Current speed,

- Color
- Owner name.
- Vehicle Identification Number
- Model

a) Write a C structure to implement a vehicle.
b) Declare a variable ***my car*** using your structure
c) Initialize your variable, ***mycar***, by choosing values that match the fields of your structure.