## Section C: C Programming

10) What is the output of the following C program? [10 marks]

```
/*  count.c  */
#include <stdio.h>

int main(){
     void counter1(int *x);
     void counter2(int y);

     int i, n = 3;
     for(i=n;i>0;i--){
          int n = i*i;
          printf("%d, ", n);
     }
     printf("\n%d\n", n);

     n = 2;
     counter1(&n);
     printf("\n%d\n", n);

     n = 3;
     counter2(n);
     printf("\n%d\n", n);
     return 0;
}
//------------------------------
void counter1(int *x){
     int i;
     for(i = *x;i>0;i--){
          printf("%d, ", (*x)++);
     }
}
//------------------------------
void counter2(int y){
     int i;
     for(i = y;i>0;i-=2){
          printf("%d, ", (y)++);
     }
}
```

11) What is the output of the following C program? [10 marks]

```
/*  pointers.c  */
#include <stdio.h>
#define N 8
int main() {
     char c, *s1="This is a string";
     int i, *ip, ia[N];
     c = s1[8];
     printf("output01 = %c\n",c);
     for (i=0;i<N;i++){
          ia[i] = 2*i;
     }
     ip = &ia[1];
     printf("output02 = %d\n", ia[0]);
     printf("output03 = %d\n", *ia+1);
     printf("output04 = %d\n", *(ia+1));
     printf("output05 = %d\n", *ip);
     printf("output06 = %d\n", *ip + 2);
     printf("output07 = %d\n", *(ip + 3));
     *ip = N-2;
     printf("output08 = %d\n", *ip++);
     printf("output09 = %d\n", ia[*ip]);
     printf("output10 = %d\n", --*ip);
     return 0 ;
}
```

| |
|---|
| output01 = |
| |
| output02 = |
| |
| output03 = |
| |
| output04 = |
| |
| output05 = |
| |
| output06 = |
| |
| output07 = |
| |
| output08 = |
| |
| output09 = |
| |
| output10 = |
| |

12) Fill in the blanks [14 marks]

The following is a program that takes a list of at most 10 input integer arguments, displays the arguments, puts the element in `nArray` and calculates the square-root of each of the input integers. If a negative integer is encountered, the program will not calculate the square-root of the negative integer and simply continues with the next number. A set of sample input and output is given.

```
/*  fillin.c  */
#include <stdio.h>
#include <stdlib.h>
#include <math.h>

_________________ MAXARGS _________________


int main(_________________ , _________________ ){

      int i, nArray[MAXARGS];
      //MAXARGS is a constant with value of 10

      for (_____________;_____________;_____________){


           printf("\narg %d = %s, ",_____________,_____________);


            _____________ = atol(_____________);


            if (_____________<0)


                  _____________;


            printf("the sqrt is _____________ ", sqrt(nArray[i]));

      }
      return 0 ;
}
```

The program is compiled into `fillin.exe`. The following is a set of sample input and output.

```
>> fillin 1 -4 4 9 -16 25 36 49
arg 1 = 1, the sqrt is 1.000000
arg 2 = -4,
arg 3 = 4, the sqrt is 2.000000
arg 4 = 9, the sqrt is 3.000000
arg 5 = -16,
arg 6 = 25, the sqrt is 5.000000
arg 7 = 36, the sqrt is 6.000000
arg 8 = 49, the sqrt is 7.000000
```

13) Fill in the blanks [6 marks]

The following is a program that takes in a string as an argument. It checks every character in the string to see if it matches given characters until it reaches the null character at the end of the string.

```
#include <stdio.h>
#define c 'a'
int main(int argc, char *argv[]){
      int i;

      _______________; //declaration of sp

      sp=argv[1];

      for(i=0;sp[i]!= _______________;i++){

            _______________ (sp[i]){

                  case '0':

                        printf("_______________");

                        break;

                  case c:

                        printf("_______________");

                        break;

                  _______________:

                        printf("%d ", i);

                        break;

            }

      }
      return 0;
}
```

The program is compiled into `pick.exe`. The following is a set of sample input and output.

```
>> pick 12abc098
0 1 Hi
3 4 Hello
6 7
```