Programming Bascis
Summer 2020
Total mark: 30

Short answer questions:

1. **What is a software? (1 mark)**
   Ans.   A software is a set of programs.

2. **What is the address of a file? (1 mark)**
   Ans.   The address of a file is the smallest address of a byte which is inside of a file.

3. **What type of programming language C is? (1 mark)**
   Ans.   C is a high-level programming language.

4. **What is the decimal representation of the following binary number: 111001. (2 marks)**
   Ans. $1*2^5+1*2^4+1*2^3+0*2^2+0*2^1+1*2^0$

   = 32+16+8+0+0+1

   =57

4. In the following code find the bug or bugs that exist. Circle the errors. (5 marks)

```
#include<stdio.h>
void main // Error 1: the () are missing after main function
{
    int arr[10];
    for (int i=0;i<10,i++)/* Error 2: the expressions are
    separated through semicolons and not the commas */
    {
        printf("\nenter a new integer:");
        scanf("%d",arr[i]) // Error 3: semicolon is missing
        //Error 4: the & is missing before the arr[i]
    }
    printf("The value of i is %d", i);
    /*Error 5: The i is asked to print which is not defined
    in the scope of main function. It was defined in the
    scope of for loop and after the loop ended the scope of
    variable I was finished there. After the for loop if we
    will try to print the value of i, it will through an
    error of an undefined variable*/
}
```

5. What is the output of the following code, explain how scope affects the output? (6 marks)

```
#include<stdio.h>

float functionX(float c, float d)
{
    c++;
    printf("\n %f",c);
    d++;
    printf("\n %f",d);
    float v=c+d;
    return v;
}
int main()
{
    float a=2.5;
    float b=1.5;
    float e;
    e=functionX(a,b);
    printf("\n %f",e);
    printf("\n %f",a);
    printf("\n %f",b);
    return 0;
}
```

```
Ans. The output will be
3.5
2.5
6
2.5
1.5
Explanation:
Then functionX accepts the value of a and b and not the
variables a and b are sent to the function, hence the values
are then accepted by variable c and d of functionX. The
variables c and d are then incremented by adding 1 to them.
Therefore, they produce output as 3.5 and 2.5 respectively.
Then they are added and the added value is returned by the
functionX. Hence, value of e is 6.

The a and b variables are inside main function where their
scope is restricted to only the main function. Hence, no
change occurs to variables a and b.

The value of variables a and b remains the same. Hence, output
of a and b is what is initialized while they were defined in
the main function. i.e., 2.5 and 1.5
```
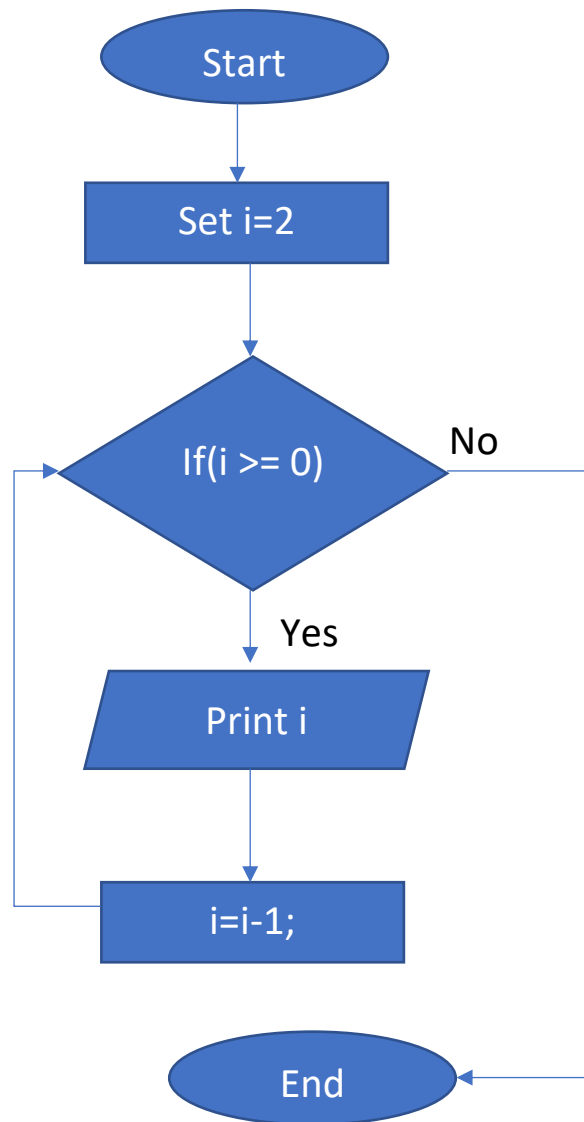
6. What is the output of this code? Show the steps of the code by drawing the related flowchart. (5 marks)

```c
#include<stdio.h>
void main()
{
    int i = 2;
    while(i >= 0)
    {
        printf("\n %d ",i);
        i--;
    }
}
```

Ans. The output will be

2

1

0

```
                    ┌─────────────┐
                    │    Start    │
                    └─────────────┘
                           │
                    ┌─────────────┐
                    │   Set i=2   │
                    └─────────────┘
                           │
                      ◇─────────◇
                      If(i >= 0)      No
                      ◇─────────◇
                           │ Yes
                    ╱─────────────╱
                    ╱   Print i   ╱
                    ╱─────────────╱
                           │
                    ┌─────────────┐
                    │   i=i-1;    │
                    └─────────────┘
                           │
                    ┌─────────────┐
                    │     End     │
                    └─────────────┘
```

7. Fill in the missing section of code to find the whether a given character by the user exists in the string *s*. (3 marks)

```c
#include<stdio.h>
void main()
{
    char s[20]={"racecar"};
    char ch;
    int found = 0;
    printf("Please enter a character: ");
    scanf("%c",&ch);

//my code
    printf("\n\nWe will search if your entered character is
include in our string : %s : or not\n\n",s);
    int i=0;
    while(s[i]!='\0')
    {
        if(s[i]==ch)
        {
            found=1;
        }
        i=i+1;
    }

    printf("And the result is:\n\n");

//my code ends here

    if(found)
    printf("The character is included in the string!");
    else
    printf("The character is not in the string!");
}
```

17. Fill in the missing section of code to find the minimum and maximum elements of the array. (3 marks)

```c
#include<stdio.h>


void main()
{
    int n;
    printf("How many integer elements you want to enter? ");
    scanf("%d",&n);
    int arr[n];
    for(int i=0;i<n;i++)
    {
        printf("\nPlease enter the next integer: ");
```

```c
        scanf("%d",&arr[i]);
    }
    int min,max;
    //my code starts here

    if(n)
    {
        if(n>1)
        {
            min=arr[0];
            for(int i=0;i<n;i++)
            {
                if(arr[i]<min)
                {
                    min=arr[i];
                }
            }

            max=arr[0];
            for(int i=0;i<n;i++)
            {
                if(arr[i]>max)
                {
                    max=arr[i];
                }
            }
        }
        else
        {
            printf("\n The number %d is both max and min",arr[n-1]);
        }
    }
    else
    {
       printf("\n The number of elements in array should be at least 2");
    }

    //my code ends here

printf("\nThe maximum elemnt is %d, and the minimum element
is %d.",max,min);
}
```

18. Fill in the missing section of code to find how many odd numbers exist in the array. (3 marks)

```c
#include<stdio.h>

void main()
{
    int arr[10]={23,-4,11,34,56,43,78,5,3,2};
    int x=0;

    //my code starts here

    for(int i=0;i<10;i++)
    {
        if((arr[i]%2)!=0)
        {
            printf("\n %d\n",arr[i]);
            x=x+1;
        }
    }

    //my code ends here

    printf("There exists %d number of odd numbers", x);
}
```