Assignment 4

Rainer T. Mayagma 2021-10417

1. **Code:**

```c
#include <stdio.h>

int main(void)
{
    int i;

    i = 1;
    while (i <= 128) {
        printf("%d ", i);
        i *= 2;
    }
    return 0;
}
```

Output:

```
1 2 4 8 16 32 64 128
Process returned 0 (0x0)   execution time : 0.028 s
Press any key to continue.
```

2. **Code:**

```c
#include <stdio.h>

int main(void)
{
    //a. while loop
    int i = 10;
    while (i < 10){
        printf("%d ", i);
        i++;
    }
    printf("\n"); //No output


    //b. for loop
    i = 10;
    for (; i < 10;){
        printf("%d ", i);
        i++;
    }
    printf("\n"); //No output


    //c. do-while loop
    i = 10;
    do{
        printf("%d ", i);
        i++;
    }
    while (i < 10); //Output 10
    //The do-while loop will be executed once even if the condition is false from the start.
    return 0;
}
```

Output:

```
10
Process returned 0 (0x0)   execution time : 1.256 s
Press any key to continue.
```

The do-while loop is not equivalent to the other two loops because it will execute once even if the condition is false.

3. **Code:**

```c
#include <stdio.h>

int main(void)
{
    int i;

    for  (i = 1; i <= 128; i *= 2){
    printf("%d ", i);}

    return 0;
}
```

Output:

```
1 2 4 8 16 32 64 128
Process returned 0 (0x0)   execution time : 0.788 s
Press any key to continue.
```

4. **Code:**

```c
#include <stdio.h>

int main(void)
{
    int power, result;
    printf("TABLE OF POWERS OF TWO\n");
    printf(" n         2 to the n\n\n");
    printf("---      --------------");

    for (power = 0; power < 11; ++power){
        if (power == 0){
            result = 1;}
        else{
            result = result * 2;}
    printf("\n%2d         %5d", power, result);
    }

    return 0;
}
```

Output:

```
TABLE OF POWERS OF TWO
 n         2 to the n
---      --------------
 0             1
 1             2
 2             4
 3             8
 4            16
 5            32
 6            64
 7           128
 8           256
 9           512
10          1024
Process returned 0 (0x0)   execution time : 1.054 s
Press any key to continue.
```

5. **Code:**

```c
#include <stdio.h>

int main(void)
{
    int i, days, start_day;
    printf("Enter number of days in month: ");
    scanf("%d", &days);
    printf("Enter the starting day of the week (1=Sun, 7=Sat): ");
    scanf("%d", &start_day);
    printf("\n");

    if(days < 32 && days > 27 && start_day < 8 && start_day > 0){
        for (i = 1; i < start_day; i++){
            printf("    ");}
        for (i = 1; i <= days; i++){
            printf("%3d", i);
            if((start_day + i - 1) % 7 == 0){
                printf("\n");}}}
    else{
        printf("[ERROR] Invalid input.");
    }
    return 0;
}
```

Output:

Valid Input

```
Enter number of days in month: 31
Enter the starting day of the week (1=Sun, 7=Sat): 5

              1  2  3
  4  5  6  7  8  9 10
 11 12 13 14 15 16 17
 18 19 20 21 22 23 24
 25 26 27 28 29 30 31

Process returned 0 (0x0)   execution time : 16.670 s
Press any key to continue.
```

Invalid Input

```
Enter number of days in month: 32
Enter the starting day of the week (1=Sun, 7=Sat): 8

[ERROR] Invalid input.
Process returned 0 (0x0)   execution time : 11.018 s
Press any key to continue.
```