

1.) Output: 1 2 4 8 16 32 64 128

```
#include <stdio.h>

int main(void)
{
    int i;

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

    return 0;
}
```

2.) The Do-While loop is not equivalent to the other two loops because it will always execute once even if the condition is not fulfilled. As you can see from the output below, when $i = 10$, and $i < 10$ is evaluated to be false, the other two loops did not print the message.

```
#include <stdio.h>

int main()
{
    int i = 10;

    printf("Output for While Loop: ");
    while (i < 10)
    {
        printf("Hello!");
    }

    printf("\nOutput for For Loop: ");
    for (; i < 10;)
    {
        printf("Hello!");
    }

    printf("\nOutput for Do-While Loop: ");
    do
    {
        printf("Hello!");
    } while (i < 10);
}
```

```
Output for While Loop:
Output for For Loop:
Output for Do-While Loop: Hello!
```

3.)

```
#include <stdio.h>

int main(void)
{
    int i;

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

    return 0;
}
```

4.)

```
#include <stdio.h>

int main(void)
{
    int i = 1, n, result = 1;

    //prompt
    printf("Enter the value of the exponent for base 2: ");
    scanf("%d", &n);

    //input validation
    if (n < 0)
    {
        printf("Invalid Input. Please Use Whole Numbers Only.");
        return 0;
    }

    //every succeeding iteration finds the next power of 2
    for (; i <= n; i++)
    {
        result *= 2;
    }

    printf("2 Raised to the Power of %d is: %d", n, result);

    return 0;
}
```

5.)

```
#include <stdio.h>

int main()
{
    int total_days, starting_day, i;

    //prompt
    printf("Enter number of days in month: ");
    scanf("%d", &total_days);

    //input validation
    switch (total_days)
    {
        case 28: case 29: case 30: case 31: break; //28, 29, 30, 31 are the only valid number of days in a month
        default: printf("Invalid Number of Days in a Month Entered. Please Check Your Input."); return 0; break;
    }

    //prompt
    printf("Enter the starting day of the week (1 = Sun, 7 = Sat): ");
    scanf("%d", &starting_day);

    //input validation
    if ((starting_day < 1) || (starting_day > 7))
    {
        printf("Invalid Starting Day Entered. Only Use Values Between 1 and 7");
        return 0;
    }
}
```

```
//prints spaces to move day 1 to appropriate starting day
for (i = 1; i < starting_day; i++)
{
    printf("  ");
}

//prints out the days and appropriate white spaces
for (i = 0; i < total_days; ++i)
{
    //prints new line every 7 days
    if (((i + starting_day) % 7) == 0) //considers the starting day to prevent formatting problems
    {
        printf("%2d\n", i + 1); //add 1 because i is initially 0
    }

    //prints out the days
    else
    {
        printf("%2d ", i + 1);
    }
}
```

Github link:

<https://github.com/rainiken27/CMSC21.git>