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Loops and Arrays

Lecture 4 Assignments

1.

```c
#include<stdio.h>
int main(){
    int i;
    i = 1;
    while (i <= 128) {
        printf("%d ", i);
        i *= 2;
    }
    return 0;
}
```

The output will start at 1 and then will continue to double and will stop showing when it reaches more than 128: 1 2 4 8 16 32 64 128.

2.

```c
#include<stdio.h>
int main(){
    int i;
    while(i < 10){
        printf("hello");
    }
    for(; i < 10;){
        printf("hello");
    }
    do{
        printf("hello");
    }while(i < 10);
}
```

With no initial value and increment for i, there is a large chance that all three loops will have the same behavior. However, it can be said that the do-while loop is different from the other loops because it will execute the code inside its body at least once.

3.

```c
#include<stdio.h>
int main(){
    for(int i = 1; i <= 128; i*=2){
        printf("%d ", i);
    }
    return 0;
}
```

```
1 2 4 8 16 32 64 128
```

4.

```c
#include<stdio.h>
int main(){
    //increase the power by 1 until it reaches 10 --> 2^10
    for(int n = 0; n <= 10; n++){
        int number = 1;
        //multiply the number by 2, n times
        for(int i = n; i > 0; i--){
            number *= 2;
        }
        printf("2 to the power of %d is %d\n", n, number);
    }
}
```

```
2 to the power of 0 is 1
2 to the power of 1 is 2
2 to the power of 2 is 4
2 to the power of 3 is 8
2 to the power of 4 is 16
2 to the power of 5 is 32
2 to the power of 6 is 64
2 to the power of 7 is 128
2 to the power of 8 is 256
2 to the power of 9 is 512
2 to the power of 10 is 1024
```

5.

```c
#include<stdio.h>
int main(){
    int monthDays;
    do{
        printf("Enter the number of days in month: ");
        scanf("%d", &monthDays);
    }while(monthDays < 1 || monthDays > 31);
    int startDay;
    printf("Enter the starting day of the week (1=Sun, 7=Sat): ");
    scanf("%d", &startDay);
    int skippedDays = (startDay-1) * 2;//multiply by 2 because each day takes 2 spaces
    //print the spaces to be skipped for the starting day
    for(int i = 0; i < skippedDays; i++){
        printf("  ");
    }
    for(int day = 1; day <= monthDays; day++){
        //startDay-1 to count the skipped days then -1 again
        //because we go to next line only when we reach next Sunday,
        //this formula calculates every day that reaches Sunday.
        //also avoid skipping line when the starting day is 1
        if((startDay-2+day)%7 == 0 && day-startDay != 0){
            printf("\n");
        }
        printf("%2d  ", day);
    }
}
```

```
Enter the number of days in month: 32
Enter the number of days in month: -31
Enter the number of days in month: 0
Enter the number of days in month: 30
Enter the starting day of the week (1=Sun, 7=Sat): 3
          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
```

6. a.

```c
bool pathway[8] = {[0] = true, [2] = true};
```

b.

```c
bool pathway[8] = {false};
pathway[0] = pathway[2] = true;
```