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Loop/Repetition Statements
Lecture 4 Assignments

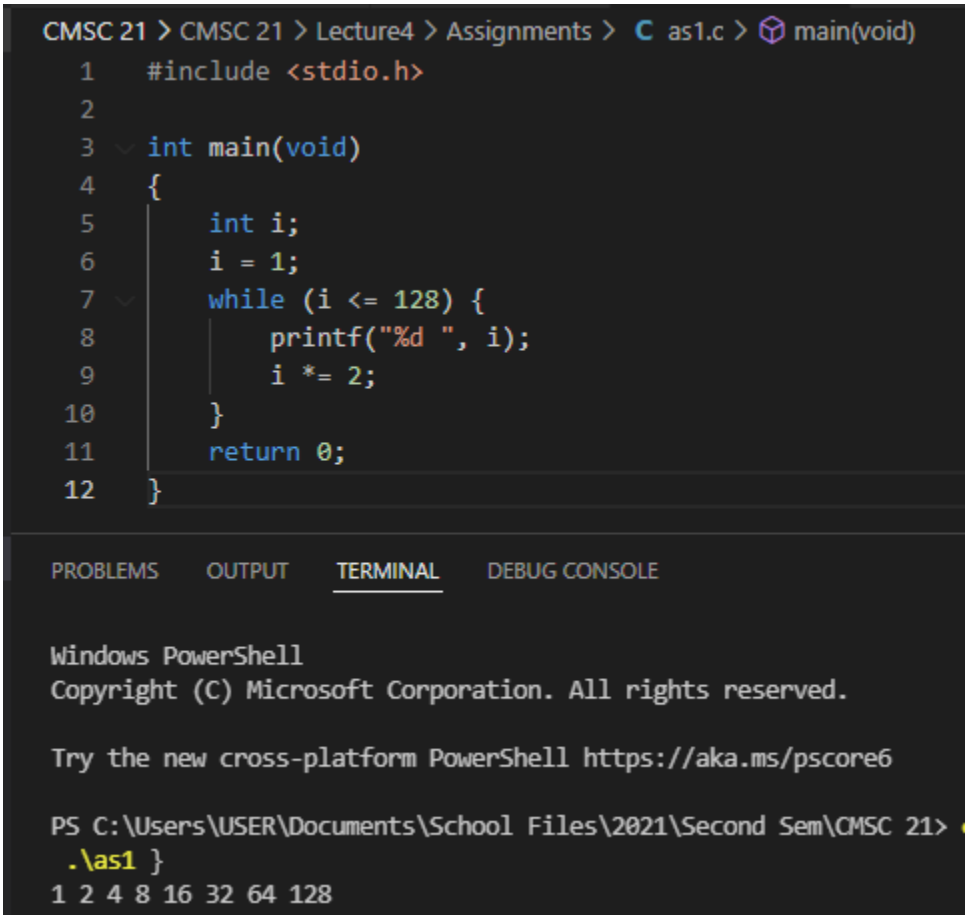
1. What is the output of the following program?

```c
#include <stdio.h>

int main(void)
{
   int i;

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

   return 0;
}
```



The output would be: 1 2 4 8 16 32 64 128

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2. Which one of the following statements is not equivalent to the other two (assuming that the loop bodies are the same)?

```
a) while (i < 10) {...}
b) for (; i < 10;) {...}
c) do {...} while (i < 10);
```

Save your code as as2.c

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CMSC 21 > CMSC 21 > Lecture4 > C as2.c > main(void)

```c
#include <stdio.h>

int main(void) {

    int i = 1;
    printf("While Loop: ");
    while (i < 10) {
        printf("%d  ", i);
        i++;
    }

    i = 1;
    printf("\n\nFor Loop: ");
    for (; i < 10; i++) {
        printf("%d  ", i);

    }

    i = 1;
    printf("\n\nDo-While Loop: ");
    do{
        printf ("%d  ", i);
        i++;
    }
    while (i < 10);

    return 0;

}
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\USER\Documents\School Files\2021\Second Sem\CMSC 21> cd "c:\Users\USER\Documen
While Loop: 1  2  3  4  5  6  7  8  9

For Loop: 1  2  3  4  5  6  7  8  9

Do-While Loop: 1  2  3  4  5  6  7  8  9
PS C:\Users\USER\Documents\School Files\2021\Second Sem\CMSC 21\CMSC 21\Lecture4>
```

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Assuming the loop bodies are the same and satisfies the condition given (i<10), the three loops will have the same output. However, given the loop bodies are the same, if it doesn't satisfy the given condition, only the Do-While Loop will print an output because it is designed to execute the loop body first once, before testing the condition if true or satisfied.

3. Convert item 1 into an equivalent for statement. You can validate your answer by checking if the produced outputs by both the while and for statements are similar.

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CMSC 21 > CMSC 21 > Lecture4 > Assignments > C as3.c > main(void)

```c
#include <stdio.h>

int main(void)
{//code 1 for checking
    int i;
    i = 1;
    printf("While Loop:\n");
    while (i <= 128) {
        printf("%d ", i);
        i *= 2;
    }

    //equivalent for statement
    printf("\n\nFor Loop:\n");
    for (i=1 ; i <= 128 ; i *= 2)
        printf("%d ", i);

    return 0;

}
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\USER\Documents\School Files\2021\Second Sem\CMSC 21> cd "c:\Users\USER
 .\as3 }
While Loop:
1 2 4 8 16 32 64 128

For Loop:
1 2 4 8 16 32 64 128
PS C:\Users\USER\Documents\School Files\2021\Second Sem\CMSC 21\CMSC 21\Lecture4\A
```

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4. Write a code that computes for the power of two:

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

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CMSC 21 > CMSC 21 > Lecture4 > Assignments > C as4.c > main(void)

```c
#include <stdio.h>

int main(void) {
    int n,x = 0, y = 1;

    printf("Enter value for n: ");
    scanf("%d", &n);
    printf("\n\n    n       2^n\n-----------------\n");

    while (x <= n) {
        printf("%5d %8d\n", x, y);
        y *= 2;
        x++;
    }


}
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\USER\Documents\School Files\2021\Second Sem\CMSC 21> cd "c:\Users\USER\Documents\Sch
 .\as4 }
Enter value for n: 10


    n       2^n
-----------------
    0         1
    1         2
    2         4
    3         8
    4        16
    5        32
    6        64
    7       128
    8       256
    9       512
   10      1024
PS C:\Users\USER\Documents\School Files\2021\Second Sem\CMSC 21\CMSC 21\Lecture4\Assignments>
```

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5. Write a program that displays a one-month calendar.

```
Enter number of days in month: 31
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 31
```

There should be a user prompt to set:

- The number of days
- The day of the week on which the month begins.

Additionally, add checkers to validate whether the days entered are valid. For instance, the following number of days are invalid: 32, -1, 0, 27.

This addition will be a good refresher to our previous topic, selection statements.

CMSC 21 > CMSC 21 > Lecture4 > Assignments > C as5.c > main(void)

```c
#include <stdio.h>

int main(void) {
    int month, week, day, n = 1;

    //to determine the number of days in a month
    while(1) {
        printf("Enter number of days in month (28, 30, or 31): \n");
        scanf("%d", &month);

        if (month < 28 || month > 31) {
            printf("Invalid input! Try again.\n");
        }
        else break;
    }

    //to determine which day of the week will the calendar start
    while (1) {
        printf("Enter the starting day of the week (1=Sun, 7=Sat): \n");
        scanf("%d", &week);

        if (week < 1 || week > 7) {            //number of days a week is only 7
            printf("Invalid input! Try again.\n");
        }
        else break;
    }

    //Printing the calendar
    printf("   S   M   T   W   T   F   S\n");
    while (n < week) {                         //prints spaces to align the starting date to the corresponding column
        printf("    ");
        n++;
    }

    for (n = 1; n <= month; n++) {             //prints the dates with correct spacing for the right alignment
        printf("%4d", n);

        if (n % 7 == ((8 - week) % 7)) {       //marks the last day of the week and prints a new line to start to sunday again
            printf("\n");
        }
    }

    return 0;
}
```

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```
Enter number of days in month (28, 30, or 31):
29
Enter the starting day of the week (1=Sun, 7=Sat):
7
                        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
PS C:\Users\USER\Documents\School Files\2021\Second Sem\CMSC 21\CM
cc as5.c -o as5 } ; if ($?) { .\as5 }
Enter number of days in month (28, 30, or 31):
28
Enter the starting day of the week (1=Sun, 7=Sat):
5
   S   M   T   W   T   F   S
                   1   2   3
   4   5   6   7   8   9  10
  11  12  13  14  15  16  17
  18  19  20  21  22  23  24
  25  26  27  28
PS C:\Users\USER\Documents\School Files\2021\Second Sem\CMSC 21\CM
cc as5.c -o as5 } ; if ($?) { .\as5 }
Enter number of days in month (28, 30, or 31):
30
Enter the starting day of the week (1=Sun, 7=Sat):
1
   S   M   T   W   T   F   S
   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
PS C:\Users\USER\Documents\School Files\2021\Second Sem\CMSC 21\CM
cc as5.c -o as5 } ; if ($?) { .\as5 }
Enter number of days in month (28, 30, or 31):
31
Enter the starting day of the week (1=Sun, 7=Sat):
3
   S   M   T   W   T   F   S
           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
PS C:\Users\USER\Documents\School Files\2021\Second Sem\CMSC 21\CM
```

Github link: https://github.com/vjauxysbrynxx/CMSC-21.git