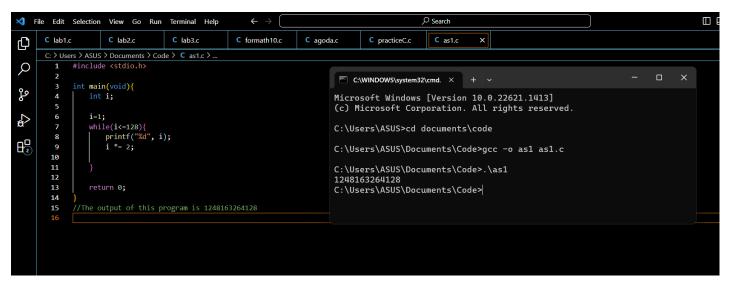
## **Loops and Arrays**

## **Lecture 4 Assignments**

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- 1. What is the output of the following program?
- >>> The output of the program is 1248163264128



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

For this item, I inserted a loop body for each loop with only the message as the difference. The following are the results for each loop:

a) while  $(i < 10) \{...\}$  result

```
C lab3.c
                                                                     C agoda.c
                                                    C formath10.c
                                                                                                                                                    C as4.c
                                                                                                                                                                      C as5.c
                                                                                                                                                                                        C as6.c
                                                                                                                                                                                                                         × ♣
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                                                                                                                     مړه
                                                                                                                    Microsoft Windows [Version 10.0.22621.1413]
(c) Microsoft Corporation. All rights reserved
          6
7
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$
                                                                                                                    C:\Users\ASUS>cd documents\code
品
                                                                                                                    C:\Users\ASUS\Documents\Code>gcc -o as2 as2.c
                                                                                                                    C:\Users\ASUS\Documents\Code>.\as2
HELLO
          12
13
14
15
16
17
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19
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21
22
23
24
25
                        printf("NICE\n");
                                                                                                                    C:\Users\ASUS\Documents\Code>
```

b) for (; i < 10;)  $\{...\}$  result

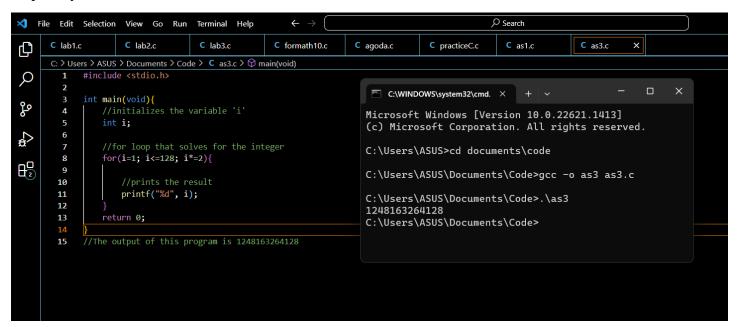
```
C formath10.c
                                    C lab3.c
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                       main(void){
int i=0;
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                                                                                                                                  C:\Users\ASUS\Documents\Code>gcc -o as2 as2.c
                           while(i<10){
   printf("HELLO\n");
   i+=1;</pre>
                                                                                                                                 C:\Users\ASUS\Documents\Code>.\as2
MY NAME
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           18
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                           C:\Users\ASUS\Documents\Code>
                          1+=1;
} while(i<10);
```

c) do  $\{...\}$  while (i < 10); result

```
C as6.c
                                       C agoda.c
                                                                                          C as5.c
                                                                                                              C as2.c
                  C lab3.c
                            C formath10.c
                                                 C practiceC.c
                                                            C as1.c
                                                                      C as3.c
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           printf("NICE\n");
                                                              C:\Users\ASUS\Documents\Code>
          i+=1;
} while(i<10);
```

>>> The results after inserting the same loop body for all three loops are the same. Therefore, they are all equivalent with each other.

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.



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

```
C formath10.c C agoda.c
                                                                                                                                                                                                         X C as5.c
ď
                                         nents > Code > C as4.c > 分 main()
Q
                   #include <math.h> //includes the math library for the power function
                                                                                                                                                        C:\WINDOWS\system32\cmd. × + ~
مړه
                    int main(){
    //initializes the vari
    int i, n, power_of_2;
                                                                                                                                                      Microsoft Windows [Version 10.0.22621.1413]
(c) Microsoft Corporation. All rights reserved.
ź
                                                                                                                                                       C:\Users\ASUS>cd documents\code
                          //prompts the user to enter a value for n and stores it in the variable 'n printf("Enter the value of n: ");
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                          printf("Enter the
scanf("%d", &n);
                                                                                                                                                      C:\Users\ASUS\Documents\Code>gcc -o as4 as4.c
                                                                                                                                                      C:\Users\ASUS\Documents\Code>.\as4
Enter the value of n: 10
TABLE OF POWERS OF TWO
n 2 to the n
                          //prints the title and headers of the table printf("TABLE OF POWERS OF TWO\n"); printf("n 2 to the n \ n");
                          //solves and prints for the powers of two
for(i=0; i<=n; i++){
    power_of_2 = pow(2,i);
    printf("%d %d\n", i, power_of_2);
                                                                                                                                                      3
4
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                                                                                                                                                      C:\Users\ASUS\Documents\Code>
```

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

```
Selection View Go Run Terminal Help
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                                            C formath10.c
                                                                            C agoda.c
                                                                                                                                                                                      C as4.c
                                                                                                                                                                                                                                         C as5.c
Ð
Q
             1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 22 23 24 25 26 27 28 30 31 32
                                                                                                                                                                    C:\WINDOWS\system32\cmd. X
                      int main(void){
   //initializes
                             //initializes the variables to be used int days=0, i, j, starting_day=0;
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                                                                                                                                                                  Microsoft Windows [Version 10.0.22621.1413]
(c) Microsoft Corporation. All rights reserv
$
                             //while-loop that checks and stores the input for the number of days
while(days<=0 || days>=32 || days<=27){
    printf("Enter number of days in month: ");
    scanf("%d", &days);</pre>
                                                                                                                                                                  C:\Users\ASUS>cd documents\code
品
                                                                                                                                                                  C:\Users\ASUS\Documents\Code>gcc -o as5 as5.c
                                                                                                                                                                 while-loop that checks and stores the input for the of the week on which the month begins */
le(starting_day<=0 || starting_day>=8){
printf("Enter the starting day of the week (1=Sun, 7=Sat): ");
                                    scanf("%d", &starting_day);
                             //prints the spaces before the starting day
for(j=1; j<starting_day; j++){
    printf(" ");
}</pre>
                             //prints the days of the month per week
for(i=1; i<=days; i++){
    printf("%3d", i);
    if((starting_day+i-1)%7==0){
        printf("\n");</pre>
                             return 0;
```

6

a. Revise line 16 such that you use a designated initializer to set pathways 0 and 2 to be true, and the rest will be false. Make the initializer as short as possible.

```
>>> bool pathway [8] = {[0] = 1, [2] = 1};
```

b. Revise line 16 such that the initializer will be short as possible (without using a designated initializer)

```
>> bool pathway [8] = {1, 0, 1};
```

Note: The code for this is saved as 'as6.c'

#7 Proceed to next page →

## 7. Code saved as 'as7.c'

```
Selection View Go Run Terminal Help
                                                                                                                                                                                                                                                                                                     C formath10.c C agoda.c
                                                                       C practiceC.c C as1.c
                                                                                                                                                                                                                                                                            C as7.c
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$
//asks the user about the location and stores it as the value of 'point' printf("Which point are you located? 0 - A, 1 - B, 2 - C, 3 - D, 4 - E, 5 - F, 6 - G, 7 - H\n"); scanf("%d", &point);
                              //switch statement to print the designated point switch(point){
    case 0: printf("At point: A\n"); break; case 1: printf("At point: B\n"); break; case 2: printf("At point: C\n"); break; case 3: printf("At point: D\n"); break; case 4: printf("At point: E\n"); break; case 5: printf("At point: F\n"); break; case 7: printf("At point: G\n"); break; case 7: printf("At point: H\n"); break; default: break;
                                //determines the nearest charging station to the location provided by the user if(point==2)∭
printf("C is a charging station");
(8)
                                 lse if(point==3){
    printf("D is a charging station");
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                                                                                                                                                                                                                                                        Ln 37, Col 6 Spaces: 4 UTF-8 CRLF C @ Go Live Win32 ₽ Q
                      C formath10.c C agoda.c
                                                                            C practiceC.c
                                                                                                                                                                                                                                                                             C as7.c
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                                                                                                                                       C as3.c
                                                                                                                                                                                              C lab3.c
                                                                                                                                                                                                                        C as5.c
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                         s > ASUS > Documents > Code > C as7.c >
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                                //determines the nearest charging station to the location provided by the user
                                if(point==2){
    printf("C is a charging station");
مړ
                                 lse if(point==3){
    printf("D is a charging station");
$
tf(road_networks[point][2]==0 && road_networks[point][3]==0){
    printf("There is no charging station nearby");
                                        lse if(road_networks[point][2]==1){
    printf("C arrived to charging station");
                                        lse if(road_networks[point][3]==1){
    printf("D arrived to charging station");
8
£62
```

## Output of the Code:

```
C:\Users\ASUS\Documents\Code>.\as7
Which point are you located? 0 - A, 1 - B, 2 - C, 3 - D, 4 - E, 5 - F, 6 - G, 7 - H
4
At point: E
D arrived to charging station
C:\Users\ASUS\Documents\Code>.\as7
Which point are you located? 0 - A, 1 - B, 2 - C, 3 - D, 4 - E, 5 - F, 6 - G, 7 - H
5
At point: F
C arrived to charging station
C:\Users\ASUS\Documents\Code>.\as7
Which point are you located? 0 - A, 1 - B, 2 - C, 3 - D, 4 - E, 5 - F, 6 - G, 7 - H
6
At point: G
D arrived to charging station
C:\Users\ASUS\Documents\Code>.\as7
Which point are you located? 0 - A, 1 - B, 2 - C, 3 - D, 4 - E, 5 - F, 6 - G, 7 - H
7
At point: H
There is no charging station nearby
C:\Users\ASUS\Documents\Code>.\as7
Which point are you located? 0 - A, 1 - B, 2 - C, 3 - D, 4 - E, 5 - F, 6 - G, 7 - H
8
The point does not exist
C:\Users\ASUS\Documents\Code>
```