Basis and Practice in Programming
week 5
For statement in C

• What is for statement?
  – A statement for run specific code area continuously while a specific condition is true

• Three types of for statement
  – while
  – do –while
  – for
For statement in C

- While

```c
while( condition )
{
    statements;
}
```

Run statements continuously while the condition is true

```c
while( i < 10 )
{
    printf("Hello world! \n");
    i++;
}
```

Run continuously printf() and i++ statements while the condition “i < 10” is true
For statement in C

• While statement

```c
/* week5 practice 1 */
#include <stdio.h>

int main(void)
{
    int i=0;

    while(i<10)
    {
        printf("Hello World! \n");
        i++;
    }
    return 0;
}
```
For statement in C

• Nested while
  – While statement in while statement

```c
/* week5 practice 2 */
#include <stdio.h>

int main(void)
{
    int i=0, j=0;
    while(i<3)
    {
        printf("The value of i = %d *** \n", i);
        
        while(j<2)
        {
            printf("The value of j = %d \n", j);
            j++;
        }
        
        i++;
        j=0;
    }
    
    return 0;
}
```
For statement in C

• Nested while

```c
/* week 5 practice 3*/
#include <stdio.h>

int main(void)
{
    int i=2;
    int j=0;

    while(i<10)
    {
        j=1;
        while(j<10)
        {
            printf("%d*%d=%d \n", i, j, i*j);
            j++;
        }
        i++;
    }

    return 0;
}
```
For statement in C

• do – while
  – Run the loop once and check the condition

```c
do
{
    statements;
}
while( condition )
```

```c
do
{
    printf("%d * %d = %d\n", val, i, val*i);
i++;
}
while( i < 10 )
```
For statement in C

- do – while

```c
/* week 5 practice 4 */
#include <stdio.h>

int main(void)
{
    int val;
    int i=1;

    printf("What stage of times table? ");
    scanf("%d", &val);

    do
    {
        printf("%d*%d=%d \n", val, i, val*i);
        i++;
    }while(i<10);

    return 0;
}
```
For statement in C

- for
  - Consists of three parts
    - Initialization statement
    - Condition statement
    - Increment, decrement statement

```c
int main()
{
    int i = 0;
    while( i<10 )
    {
        printf("Hello world!\n");
        i++;
    }
    ...
}

for( int i = 0; i<10; i++; )
{
    statements;
}
```
For statement in C

- Nested while

```c
/* week 5 practice 5*/
#include <stdio.h>

int main(void)
{
    int i, j;

    for(i=2; i<10; i++)
    {
        for(j=1; j<10; j++)
            printf("%d*%d=%d \n", i, j, i*j);
    }

    return 0;
}
```
For statement in C

• Braces of while statement
  – Braces ( '{' and '}' ) are essential with two or more statements

```c
while(i<10)
{
    printf("Hello World! \n");
    i++;
}
```

```c
while(i<10)
    printf("Hello World! \n"), i++;
```
For statement in C

• Infinite loop

```c
while( 1 ) // the value 1 instead of condition statement
{
    printf("Hello World! \n");
    i++;}
```
For statement in C

• Week 5 exercise
  – Input a integer odd number from a user
  – Show a sandglass which consists of character ‘*’
  – The input number is the size of bottom side of the sandglass
  – Due date: Oct, 16, 11:59 pm

Input
7

Output
*******
******
***
*
**
*****
******
For statement in C

- Week 5 exercise
  - Example output