

Homework #4 Solution

(Java Programming for Beginners - OnLine)

Note: Code snippets is not full class, it can be part of a method or in a main class

4.1 Here is a listing of a program, use a paper computer and answer how many times each loop is executed

a) How many times this loop is executed?

```
int i = 0;
while (i++ < 10) {
    System.out.println("Hello World: " + i);
}
```

Answer:

10 times

b) How many times this loop is executed if we changed the counter increment to ++i?

```
i = 0;
while (++i < 10) {
    System.out.println("Hello World: " + i);
}
```

Answer:

9 times

c) How many times this loop is executed, if it is executed immediately after the loop in #b, i.e. i is not reinitialized before the loop?

```
while (++i < 10) {
    System.out.println("Hello World: " + i);
}
```

Answer:

Interestingly, 0 times, as the i is already 10 after the b) loop

4.2 Remember our famous homework#1 program? This program draws a box 20 characters in width and 10 characters in height, using a '-' for horizontal line and '|' for vertical line.

```
System.out.println("Using brutal force: ");
System.out.println("-----");
System.out.println("|");
System.out.println("|");
System.out.println("|");
System.out.println("|");
System.out.println("|");
System.out.println("|");
System.out.println("|");
System.out.println("|");
System.out.println("-----");
```

Only println() is used for this purposes. A good solution could involve a loop which now you know. So, write the solution-using loop.

Hint: One way to solve this would be by writing a loop to draw top line and nested loops to draw the middle lines and later similar loop like top for the bottom line.

Answer:

```
System.out.println(
    "\nUsing while loop, better solution: ");
// Draw first line
// "-----"
int j = 0;
while (j < 20)
{
    System.out.print("-");
    j++;
}

System.out.println();

int k = 0;
while (k < 8)
    //remember, there are only 10-2=8 lines in the middle
    {
        //then          |          |
```

```

j = 0;
System.out.print("|"); //left pipe
while (j < 18)
    //there are only 20-2 spaces in the center
    {
        System.out.printf(" "); //center spaces
        j++;
    }
System.out.print("|"); //write pipe
System.out.println(); //new line
k++;
}

//finally last line
//-----
j = 0;
while (j < 20)
{
    System.out.printf("-");
    j++;
}

```

4.3 Change the while loop in 4.2 to do..while loop to print the same box.

Answer:

```

System.out.println("\nUsing do .. while loop: ");
// Draw first line
//"-----"
j = 0;
do
{
    System.out.print("-");
    j++;
} while (j < 20);

System.out.println();

k = 0;
do //remember, there are only 10-2=8 lines in the middle
{
    //then          |          |
    j = 0;
    System.out.print("|"); //left pipe

```

```

do //there are only 20-2 spaces in the center
{
    System.out.printf(" "); //center spaces
    j++;
} while (j < 18);

System.out.print("|"); //write pipe
System.out.println(); //new line
k++;
} while (k < 8);

//finally last line
//-----
j = 0;
do
{
    System.out.printf("-");
    j++;
} while (j < 20);

```

4.4 Change the while loop in 4.3 to for-loop to print the same box.

Answer:

```

System.out.println("\nUsing for-loop: ");
int count1, count2;
int height=10, width=20;
for (count1=1;count1 < width;count1++)
{
    System.out.print("-");
}
System.out.print("\n");
for(count1=1;count1< height;count1++)
{
    System.out.print("|");
    for (count2=1;count2 < width-2;count2++)
        System.out.print(" ");
    System.out.print("|\\n");
}
for(count1=1;count1< width;count1++)
{
    System.out.print("-");
}
System.out.print("\\n\\n");

```

4.5 Modify the program in 4.4 and use variables for horizontal, vertical characters instead of hard coded values like '|', '-'. Ask user for all these values height, width, and characters to draw ('|', '-') instead of using hard coded values.

Answer:

```
System.out.println("\nUsing for-loop and user values: ");
int loop1, loop2;
char hChar, vChar;
int ht, wd;

Scanner input = new Scanner(System.in);
System.out.print("\nPlease enter height of a box: ");
ht = input.nextInt();
System.out.print("\nPlease enter width of a box: ");
wd = input.nextInt();

input.nextLine(); //clean the buffer
System.out.print(
    "\nPlease enter the horizontal charcters to draw box: ");
hChar = input.nextLine().charAt(0);
System.out.print(
    "\nPlease enter the vertical charcters to draw box: ");
vChar = input.nextLine().charAt(0);

for (loop1=1; loop1 < wd; loop1++)
{
    System.out.print(" " + hChar);
}
System.out.print("\n");
for(loop1=1; loop1< ht-2; loop1++)
{
    System.out.print(" "+ vChar);
    for (loop2=1; loop2 < wd-2; loop2++)
        System.out.print(" ");
    System.out.print(" " + vChar + "\n");
}
for(loop1=1; loop1< wd; loop1++)
{
    System.out.print(hChar);
}
System.out.print("\n\n");
```

4.6 Modify the program in 4.5 so that it repeats the drawing by asking user to continue. If user enters 'y' then continue drawing more boxes.

Answer:

```
System.out.println("\nUsing for-loop and user values: ");
int x, y;
char hChar1, vChar1;
int ht1, wd1;
char answer = 'y';

Scanner input1 = new Scanner(System.in);

while (answer == 'y') {
    System.out.print("\nPlease enter height of a box: ");
    ht1 = input1.nextInt();
    System.out.print("\nPlease enter width of a box: ");
    wd1 = input1.nextInt();

    input1.nextLine(); //clean the buffer
    System.out.print("\nPlease enter the horizontal
                      characters to draw box: ");
    hChar1 = input1.nextLine().charAt(0);
    System.out.print("\nPlease enter the vertical
                      characters to draw box: ");
    vChar1 = input1.nextLine().charAt(0);

    for (x=1; x< wd1;x++)
    {
        System.out.print(" " + hChar1);
    }
    System.out.print("\n");
    for(x=1;x< ht1-2;x++)
    {
        System.out.print(" "+ vChar1);
        for (y=1;y < wd1-2;y++)
            System.out.print(" ");
        System.out.print(" " + vChar1 + "\n");
    }
    for(x=1;x< wd1;x++)
    {
        System.out.print(hChar1);
    }
}
```

```
System.out.print("\n\n");

System.out.print("Continue? Type 'y' for yes: ");
answer = input1.nextLine().charAt(0);
}
System.out.println("\n\nThank you for using my draw box
program");
```