

Assignment-1 Solutions

QUESTION 1

This is a simple block of code and merely substituting the values will provide the answers. In case there is a doubt as to the flow of arithmetic operations (such as the one in the ‘else’ section), it is enough to remember that in absence of parentheses, multiplication and division have higher priority over addition and subtraction. Following that, the execution simply follows a left-to-right order.

Please be VERY CAREFUL while copying any code from the question pdf onto code blocks.

The given code is –

```
if ((x>y) && (y >0))
x=x+y;
y++;
if (x >10)
y=x*y;
else
y=x+x*x+y;
printf (" the values of x and y are respectively %d and %d\n", x, y);
```

Do NOT add curly braces after the ‘if’ statement. “y++” is NOT part of the if statement. Essentially in absence of curly braces, only the first statement after ‘if’, ‘for’, ‘while’ etc gets executed. So, ONLY “x = x+y” gets executed inside the ‘if’ statement. “y++” occurs even in case the ‘if’ statement is FALSE. In the future, please do not modify the code unless the code does not run at all. Even in those cases, the errors might be with syntax etc. Do not add your own curly braces as this will alter the whole flow of command

1. the values of x and y are respectively 8 and 76
2. the values of x and y are respectively 11 and 55
3. the values of x and y are respectively 5 and 30
4. the values of x and y are respectively 11 and 143

QUESTION 2

The statement under ‘if(0)’ is automatically evaluated as ‘False’ (0=false). Whenever ‘if’ is used, the conditions inside it must evaluate to ‘true’ (basically a non-zero value). Thus the ‘false’ in the if condition makes the program skip to the ‘else’ statement and execute that statement. Later it proceeds to the next ‘printf’ before ‘return(0)’ which finishes the main function.

The output that is generated is – ***Where am I? if the world ended on December 21 , 2012.***

```

main.c x
#include <stdio.h>
#include <stdlib.h>

int main ( void )
{
    if (0)
        printf ("Good Bye World , ");
    else
        printf ("Where am I ? ");
    printf ("if the world ended on December 21 , 2012.\n");
    return 0;
}

C:\Users\Vahid\workspace\codeBlocks\Test02\bin\Debug\Test02.exe
Where am I ? if the world ended on December 21 , 2012.
Process returned 0 (0x0)   execution time : 0.016 s
Press any key to continue.

```

Figure 1 - Question 2 results

QUESTION 3

Yes the program executes properly and the results are:

3/4 = 0.000000

Both 3 and 4 here are 'int' type by default. After dividing, the digits after decimal point in the answer are not considered and only the integer part is considered, which is '0'. Yet the decimal point and the zero digits after decimal are present in the displayed answer because '%f' is used and that formats the output for floating point. Hence we get the computed answer of '0' followed by a decimal point and more zeroes to signify "float" representation.

3.0/4 = 0.750000

To perform the operation, the int '4' value is first type cast into float '4.0' in order to perform the arithmetic operation with 3.0 which is already automatically declared as a float value due to the presence of the decimal point. It is important to remember that Float has more priority than Int while type casting. Thus, unlike the previous case, the decimal part of the answer is properly displayed here to reflect the digits AFTER the decimal point)

1+2/3+0.4 = 1.400000

Here 2/3 is evaluated to '0' as they are 'int' type. Thus 1+0+0.4 = 1.4. To further understand this, you can substitute the 2/3 as 3/3 or 4/3 or 5/3. ALL of these would evaluate to '1' and the final answer would be 1+1+0.4 = 2.4 in all cases.) Note – As with question 1, division is performed before addition.

QUESTION 4

STEP 1 : Problem statement -

Design a program that accepts a student's percentage mark and prints the corresponding Letter Grade based on a conversion scheme.

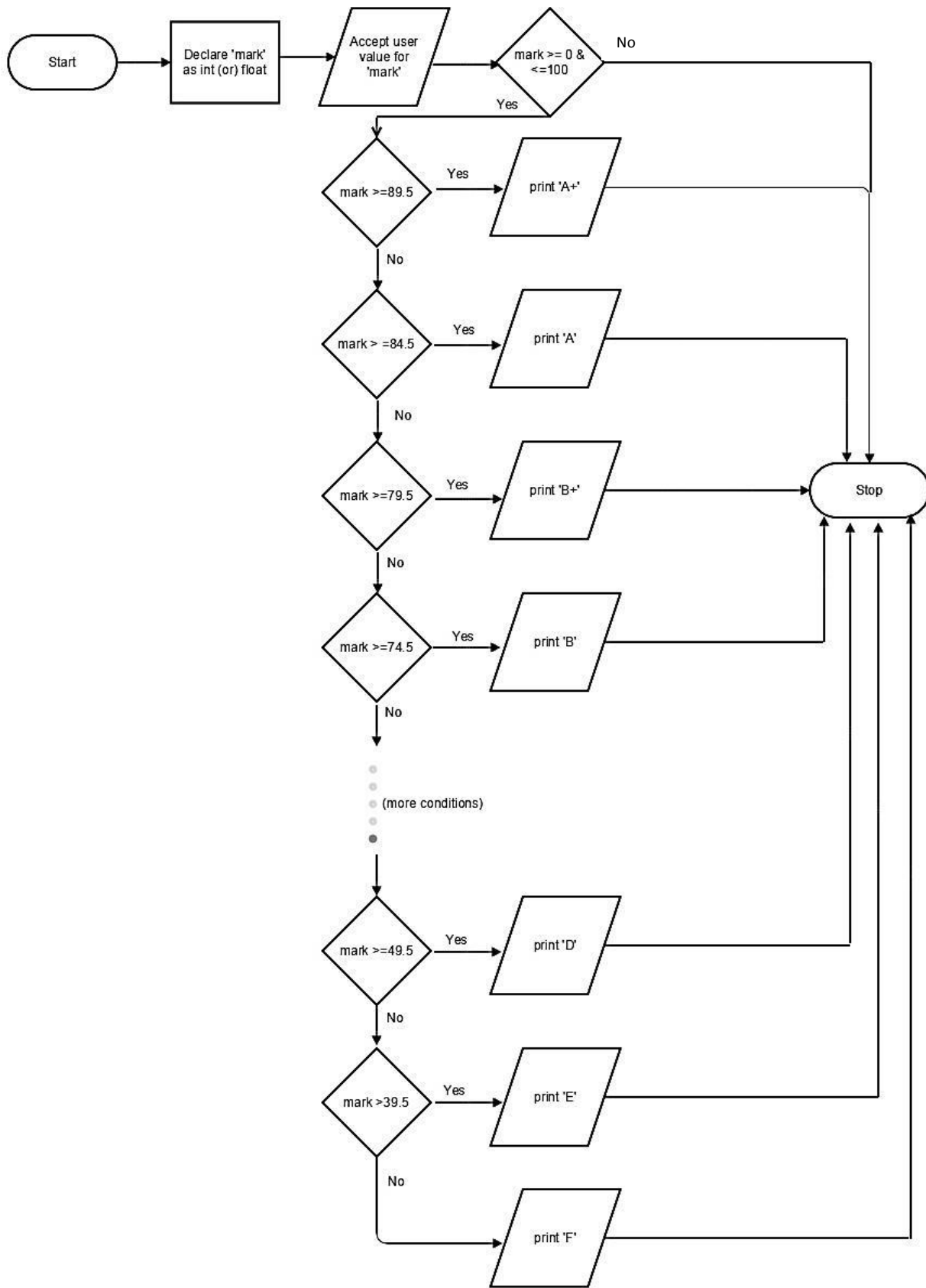
STEP 2 : I/O description



STEP 3 : Flowchart and grading conversion scale

University of Ottawa's grading scale –

Percentage marks	Letter grade
90 – 100	A+
85 – 90	A
80 – 84	A-
75 – 79	B+
70 – 74	B
65 – 69	C+
60 – 64	C
55 – 59	D+
50 – 54	D
40 – 49	E
0 – 39	F



STEP 4 : C Code for the above Flowchart –

```
#include<stdio.h>
int main()
{
    float mark;    /* float allows us to enter 0.5 values such as 84.5 etc */

    printf("\nEnter your percentage mark(between 0 and 100)\n");
    scanf("%f",&mark);

    if ((mark>=0) && (mark<=100))
    {

        if(mark >= 89.5)
            printf("\nGrade is A+");          /* Curly braces are optional here as
                                                there is only 1 statement under 'if' */

        else if (mark>=84.5)
            printf("\nGrade is A");

        else if (mark>=79.5)
            printf("\nGrade is A-");

        else if (mark>=74.5)
            printf("\nGrade is B+");

        else if (mark>=69.5)
            printf("\nGrade is B");

        else if (mark>=64.5)
            printf("\nGrade is C+");

        else if (mark>=59.5)
            printf("\nGrade is C");

        else if (mark>=54.5)
            printf("\nGrade is D+");

        else if (mark>=49.5)
            printf("\nGrade is D");

        else if (mark>=39.5)
            printf("\nGrade is E");

        else
            printf("\nGrade is F");

    }
    else
        printf("\nError. Value not within 0-100");
    return(0);
}
```

STEP 5 : Sample output for the above code

```
"C:\GNG 1106\Assignment 1\Solution_program.exe"
Enter your percentage mark
95
Grade is A+
Process returned 0 (0x0)   execution time : 6.364 s
Press any key to continue.
_
```

```
"C:\GNG 1106\Assignment 1\Solution_program.exe"
Enter your percentage mark
61
Grade is C
Process returned 0 (0x0)   execution time : 7.257 s
Press any key to continue.
```

```
"C:\GNG 1106\Assignment 1\Solution_program.exe"
Enter your percentage mark
39
Grade is F
Process returned 0 (0x0)   execution time : 6.083 s
Press any key to continue.
_
```

```
C:\GNG 1106\Assignment 1\Solution_program.exe
Enter your percentage mark
-1
Error. Mark has to be between 1 and 100
-----
Process exited after 1.376 seconds with return value 0
Press any key to continue . . .
```

```
C:\GNG 1106\Assignment 1\Solution_program.exe
Enter your percentage mark
110
Error. Mark has to be between 1 and 100
-----
Process exited after 1.93 seconds with return value 0
Press any key to continue . . .
```

