

Midterm 1

23<sup>rd</sup> Sept 2019, 11:00 am – 12:00 noon

Course Code: CS118	Course Name: Programming Fundamentals
Instructor Name: Dr. Farooque/ Sir Shahzad/ Sir Shoaib/ Sir Basit	
Student Roll No: <b>Solution By Basit Jasani</b>	Section No:

Instructions:

- Return the question paper and make sure to keep it inside your answer sheet.
- Read each question completely before answering it. There are **5 questions and 3 pages**.
- In case of any ambiguity, you may make assumption. But your assumption should not contradict any statement in the question paper.
- You are **not allowed to write** anything on the question paper (except your ID and group).

**Time:** 60 minutes.

**Max Marks:** 50 Marks

**Q 1.** Complete the missing statement(s) (where you see -----) in the following program to obtain the outlined output: **[10 Marks]**

```
void main() {
    int cnt; char ch;
    for(ch='A', cnt=1; -----; cnt++,ch++)
    {
        if(cnt<=4)
        {
            printf(" %c ", ch);
        }
        else
        {
            -----
            -----
        }
    }
}
```

**Output:**

```
A B C D
E F G H
I J K L
```

**Version 1**

**#include<stdio.h>**

**int main()**

**{**

**int cnt; char ch;**

**for(ch='A', cnt=1; ch<='L'; cnt++,ch++)**

**{**

**if(cnt<=4)**

**{**

**printf("%c ", ch);**

**}**

**else**

```

        {
            printf("\n");
            printf("%c ", ch);
            cnt = 1;
        }
        getchar();
        return 1;
    }
}

```

## Version 2

```

#include<stdio.h>

int main()
{
    int cnt; char ch;

    for(ch='A', cnt=1; cnt<=12; cnt++,ch++)
    {
        if(cnt<=4)
        {
            printf("%c ", ch);
        }
        else
        {
            if(cnt%4==1)
                printf("\n%c ", ch);

            else
                printf("%c ", ch);
        }
    }

    getchar();
    return 1;
}

```

**Q 2.** Write on the answer sheet that following statements are TRUE or FALSE. **[1 Mark each]**

1. The default case is required in the switch selection statement. **F**
2. The break statement is required in the default case of a switch selection statement. **F**
3. The expression  $(x > y \ \&\& \ a < b)$  is true if either  $x > y$  is true or  $a < b$  is true. **F**
4. An expression containing the `||` operator is true if either or both of its operands is true. **T**
5. Function `printf` always begins printing at the beginning of a new line. **F**
6. Comments cause the computer to display the text after `//` on the screen when the program is executed. **F**
7. The escape sequence `\n` when used in a `printf` format control string causes the cursor to position to the beginning of the next line on the screen. **T**
8. C considers the variables **number** and **NuMbEr** to be identical. **F**
9. All arguments following the format control string in a `printf` function must be preceded by an ampersand (`&`). **F**
10. The arithmetic operators `*`, `/`, `%`, `+` and `-` all have the same level of precedence. **F**

**Q 3.** Draw **PAC, IC, IPO and Flowchart** for a system, which solves following equation for **A** and print the final value. The formula required for the main equation are also given below.

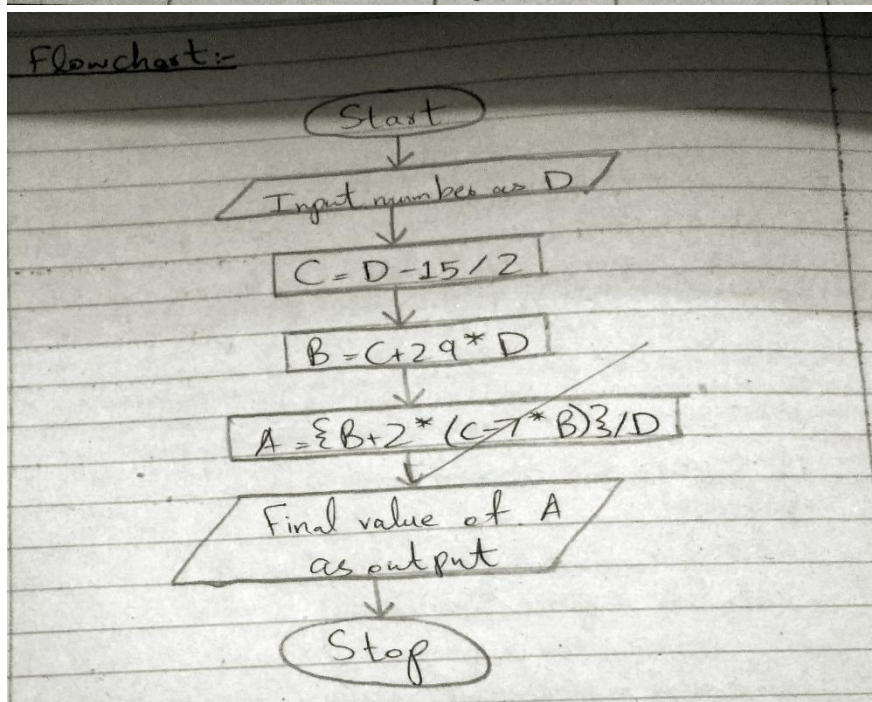
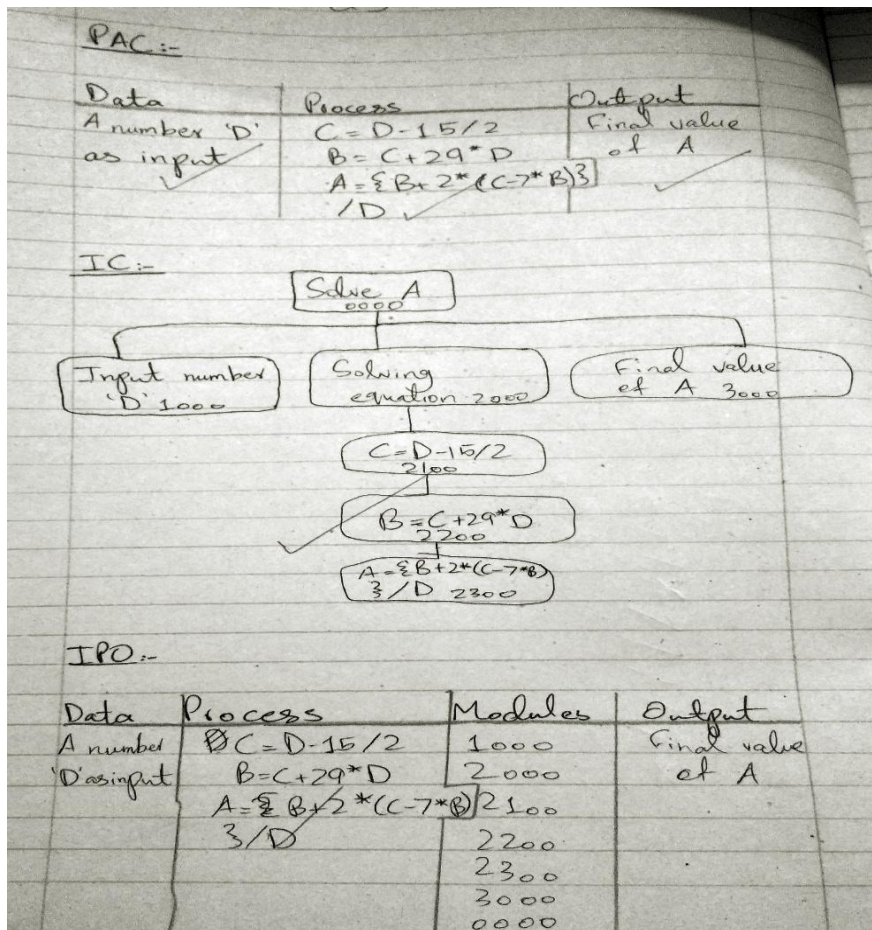
**[2+2+2+4 = 10 Marks]**

Main equation:  $A = \{B + 2 * (C - 7 * B)\} / D$

$B = C + 29 * D,$

$C = D - 15 / 2,$

$D =$  User inputted number



**Q 4.** In this task, you are required to write a C program for FBR to calculate the total tax payable by a Pakistani citizen. The payment plan according to the price range of a mobile phone is listed below: **[10 Marks]**

Imported Mobiles Fixed Taxation Plan			
Mobile Price Range (PKR)	Custom Duty	Sales Tax	Income Tax
0-30000	1%	3%	Nil
30001-50000	4%	4%	Nil
50001-75000	8%	5%	3%
75001 & above	15%	12%	6%

**Expected Input:**

Enter the price of the imported mobile? 55000

**Expected Output:**

Custom Duty: 4400

Sales Tax: 2750

Income Tax: 1650

**Total Tax payable: 8800**

```
#include<stdio.h>
```

```
main()
```

```
{
```

```
    int MobilePrice;
```

```
    float CustomDuty, SalesTax, IncomeTax, TotalTax;
```

```
    int flag = 0;
```

```
    printf("Enter the price of a mobile you want to import?: ");
```

```
    scanf("%d", &MobilePrice);
```

```
    if(MobilePrice>0 && MobilePrice<=30000)
```

```
    {
```

```
        CustomDuty = MobilePrice*0.01;
```

```
        SalesTax = MobilePrice*0.03;
```

```
        IncomeTax = 0;
```

```
    }
```

```
    else if(MobilePrice>30000 && MobilePrice<=50000)
```

```
{  
    CustomDuty = MobilePrice*0.04;  
    SalesTax = MobilePrice*0.04;  
    IncomeTax = 0;  
}  
  
else if(MobilePrice>50000 && MobilePrice<=75000)  
{  
    CustomDuty = MobilePrice*0.08;  
    SalesTax = MobilePrice*0.05;  
    IncomeTax = MobilePrice*0.03;  
}  
  
else if(MobilePrice>75000)  
{  
    CustomDuty = MobilePrice*0.10;  
    SalesTax = MobilePrice*0.08;  
    IncomeTax = MobilePrice*0.04;  
}  
  
else  
{  
    printf("Wrong input");  
    flag = 1;  
}  
  
if (flag==0)  
{  
    printf("\nCustom Duty: %f", CustomDuty);  
    printf("\nSales Tax: %f", SalesTax);  
    printf("\nIncome Tax: %f", IncomeTax);  
    TotalTax = (CustomDuty+SalesTax+IncomeTax);  
    printf("\nTotal Tax Payable: %f", TotalTax);  
}  
  
getchar();  
  
}
```



**Q 5.** Read a positive integer value from user, and compute the following sequence: If the number is even, halve it; if it's odd, multiply by 3 and add 1. Repeat this process until the value is 1, printing out each value. Finally print out how many times of these operations you performed. Example output might be: **[10 Marks]**

Initial value is 3

Next value is 10

Next value is 5

Next value is 16

Next value is 8

Next value is 4

Next value is 2

Next value is 1

Final value 1, number of steps 7

If the input value is less than 1, print a message containing the word "Error" and perform an exit (0);

```
include <stdio.h>
void main ()
{
    int n, a, s ;

    printf("\n Enter a positive Integer: ");
    scanf("%d", &a); if(a < 0){ printf("Error"); exit(0); }
    while (a > 0)
    {
        if (a % 2 == 0)
        {
            a = a / 2 ;
            printf(" %d ", a);
            s += 1 ;
        }
        if (a % 2 == 1)
        {
            a = (a * 3) + 1 ;
            printf(" %d ", a);
            s = s + 1 ;
        }
    }
    printf("\n final value = 1");
    printf("\n Number of step = %d", s);
}
```

**BEST OF LUCK!**