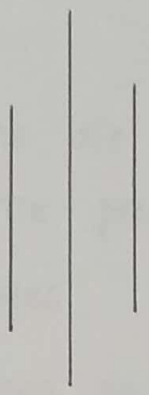
KATHMANDU UNIVERSITY

Department of Computer Engineering



A

Lab Report On

Computer Programming {COMP 102}

Lab Sheet No: 1

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Submission date: 22/02/2023

WEEK 1: FAMILIARIZATION WITH LINUX ENVIRONMENT

We familiarized ourselves to the ~~Fe~~ Linux Fedora ~~worksp~~ workspace and some terminal functions were studied that is used in the execution of C- program.

Some terminal functions are as follows:

i) pwd : It shows the present working directory.

ii) ls : listing of files

iii) cd ~ ↵ : It takes us to home directory

iv) cd Desktop ↵ : It takes us to Desktop directory.

v) mkdir name : It creates a folder.

vi) gedit filename : It opens a file and ~~of~~ saves the file.

vii) gcc filename : It compiles the program file and indicates the error present.

viii) ./a.out : It runs the file recently compiled using gcc function.

ix) gcc hello.c -o 1 : This converts the file name of hello.c as by compiling it as file name 1.

To run this file,

./1 ↵ : Runs the program.

We underwent the following steps to create a folder and open a file hello.c.

→ [.....] pwd

/Users/Home { Shows the present working directory }.

→ [------] ls

{ Shows the files in Home directory }

→ [------] cd Desktop

{ Brings us to home directory }

→ [-----] ls

{ Lists all desktop files }

→ mkdir Kadel.

{ creates a folder Kadel on Desktop }

→ cd Kadel

{ Brings us to Kadel directory }.

→ gedit hello.c

{ It opens file hello.c saved inside folder Kadel in desktop }.

In this way, we familiarized with Linux Fedora workspace on week 1.

WEEK 2: SAMPLE C-PROGRAM

In week two, we created a program printing Hellow World and another program calculating ~~such~~ sum of two numbers.

Q.1: WAP to print "Hellow World!".

Ans:

*) Algorithm

i) START

ii) DISPLAY HELLO WORLD!

iii) STOP

*) Source code:

```
# include <stdio.h>

void main ()   // Declares main function
{
  printf ("Hellow World!"); // prints string inside " "
}
```

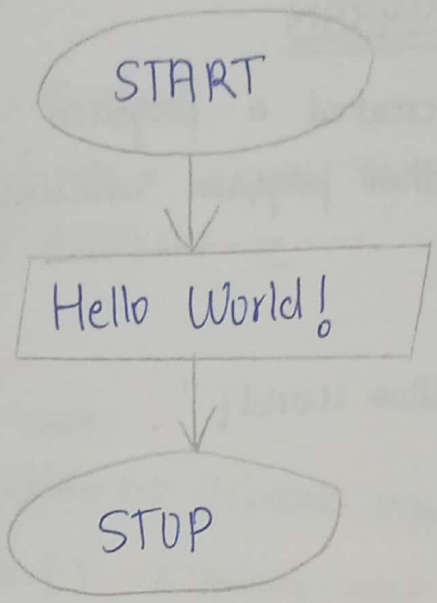
* Output

```
Hello World!
```

*) Description:

This program prints the characters inside double quotation marks (" "). In this case, "Hello World!" is printed.

*) Flowchart:



<Q.2> WAP to read two numbers and display its sum.

Ans:

*) Algorithm

i) START

ii) READ X and Y

iii) ADD X and Y EQUAL TO Z

iv) ~~Disp~~ DISPLAY Z

v) STOP

*) Source code:

```
#include <stdio.h> || Contain input-output functions
void main()   || Declares main function
{ int x,y,z   || Declaring variables
  printf("Enter two numbers\n");
  scanf("%d %d", &x, &y); || Reads two numbers as integers.
  ~~sum = x+y;~~  z=x+y; || adds and assigns to z
  printf("Sum = \n", z); || Displays sum.
  }
```

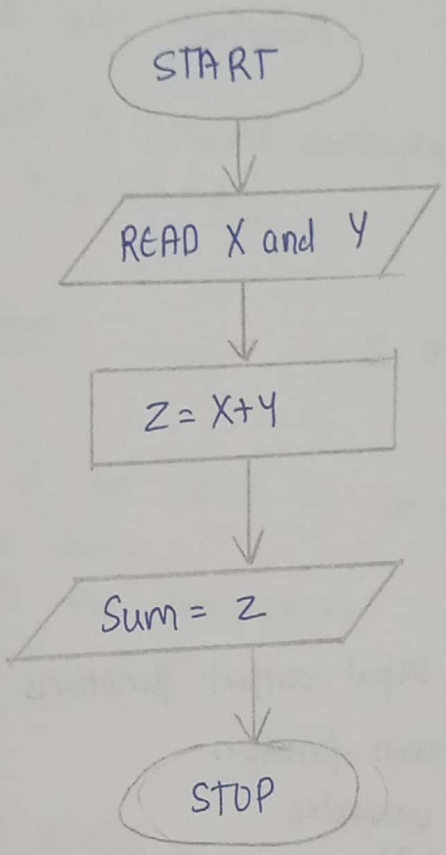
*) Output:

```
Enter two numbers
3
4
Sum = 7
```

*) Description

This program reads two numbers, in this case 3 and 4 and displays its sum which equals to 7.

*) Fluwchart:



WEEK 3: OPERATIONS AND EXPRESSIONS

On week 3, we learnt about execution of operators and expressions.

Q.1: WAP to convert centrigrade to Fahrenheit.
[F = 9/5*C+32]

Ans:

*) Algorithm

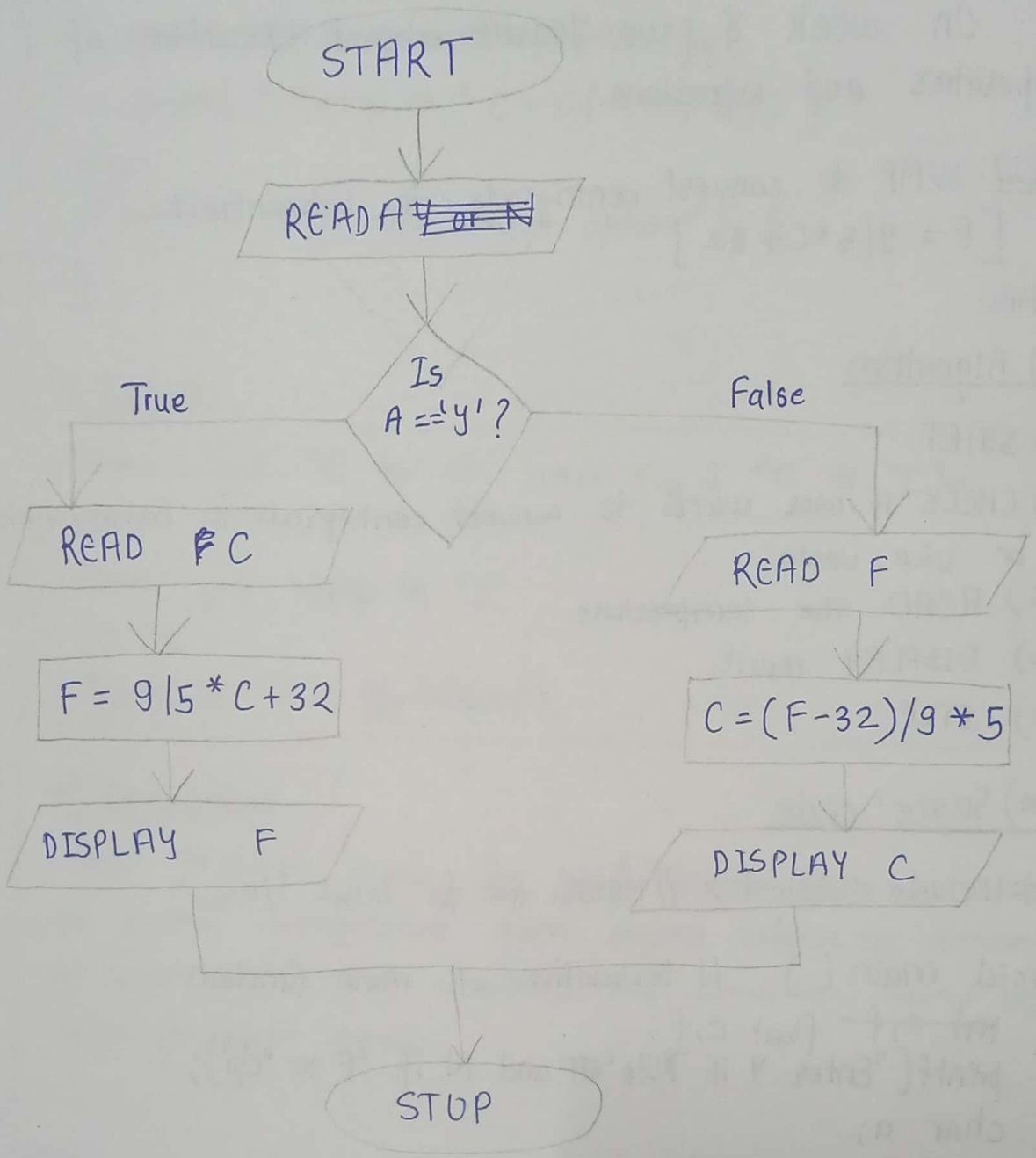
i) START
ii) CHECK if user wants to convert centrigrade to Fahrenheit or vice versa
iii) READ the temperature
iv) DISPLAY result
v) STOP

*) Source code

```
#include <stdio.h> // Header file for basic i/o

void main ()  // Declaration of main function
{ int c,f  float c,f;
  printf("Enter Y if °C to °F and N if °F to °C\n");
  char a;
  scanf ("%c", &a);
  if (a == 'Y')
   { printf("Enter your temp in °C\n");
     scanf("%f", &c);
     f = 9/5 * c + 32;
     printf (" Temp in °F=%f\n", f); }
  else if (a == 'N')
   { printf("Enter your temp in °F\n");
     scanf ("%f", &f);
```

*) Flowchart


START
READ A ~~Y or N~~
Is A =='y' ?
True
False
READ C
F = 9/5 * C + 32
DISPLAY F
READ F
C = (F-32)/9 * 5
DISPLAY C
STOP

```
    C = (F-32)/9 * 5;
    printf("Temp in °C = %.f \n", C);
    printf("Temp in °C = %.f \n", c); }
  else
  {printf("Enter the correct option "); }
}
```

*) Output:

```
Enter Y if °C to °F and N if °F to °C
Y
Enter your temp in °C
32.86
Temp in °F = 91.148701
```

*) Description

This program reads the wish of the user on whether to convert temperature from degree celsius to fahrenheit or vice-versa and conducts the operation based on user provided input.

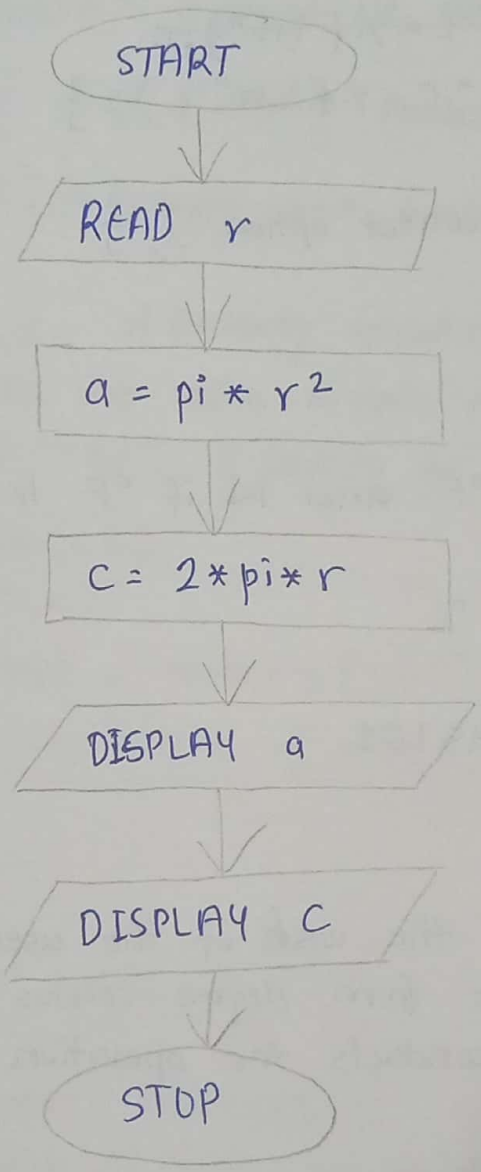
Q.2): WAP to calculate area and circumference of circle.

Ans

*) Algorithm:

i) START
ii) READ the radius
iii) CALCULATE area and circumference
iv) Display Area and Circumference
v) STOP

*) Flowchart



*) Source code:

```
#include<stdio.h>  // Header file basic i/o
#include<math.h>  // Header file math functions

#define PI 3.14  // Defining symbolic constant

void main()  // Declaring main function
{
float r, a, c;  // Declaring variables
printf("Enter the radius of circle \n");
scanf("%f", &r);  // Scanning for radius
a = PI * pow(r, 2);
c = 2 * PI * r
printf("Area of circle = %f \n", a);  /* Displaying aued */
printf("Circumference of circle = %f \n", c);  // Circumference
}
```

* Output

```
Enter the radius of circle
7.168
Area of circle = 161.333903
Circumference of circle = 45.015040
```

*) Description:

This program reads the radius of the circle and displays its area and circumference. In this case, it shows us the area and circumference of circle with radius 7.168 units.

Q.3) Write a program that calculates the area of triangle.

Ans

*) Algorithm:

i) START
ii) READ a, b, c
iii) CALCULATE area
iv) DISPLAY area
v) STOP

*) Source code:

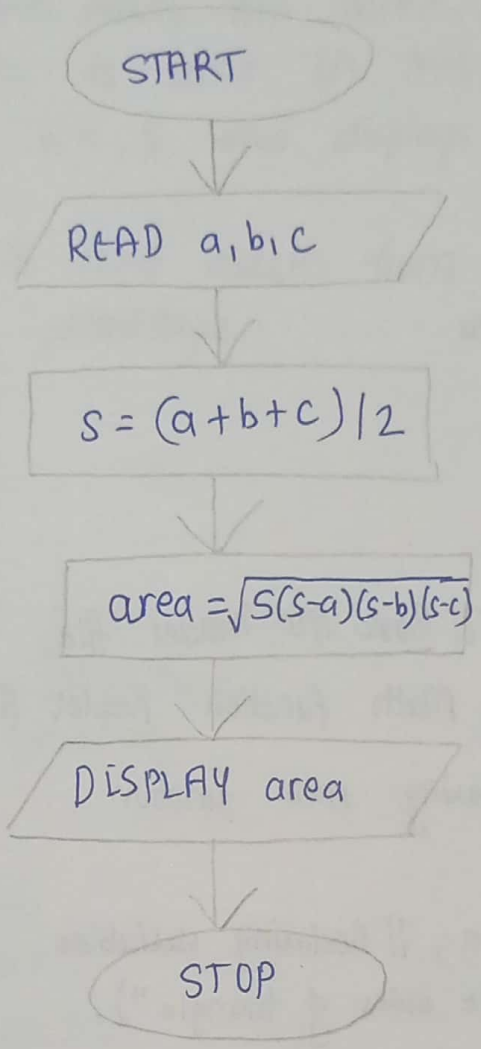
```
#include <stdio.h>  // Basic i/o header file
#include <math.h>  // Math function header file.

void main()  // Declaring main function
{
float a, b, c, s, p, area;  // Declaring variables
printf("Enter the three sides of triangle");
scanf("%f %f %f", &a, &b, &c);
s = (a + b + c) / 2;
p = s * (s-a) * (s-b) * (s-c);
area = sqrt(p);
printf("Area of triangle = %f \n", area);
}
```

*) Output:

```
Enter three sides of triangle
3.
4
5
Area = 6.000000
```

*) Flowchart:



*) Description:

This program reads the three sides of the triangle and calculates its area. In this case, it reads the three sides 3, 4, 5 and displays area 6.

Q.39: WAP to read marks from each subject and display its percentage.

Ans:

*) Algorithm:

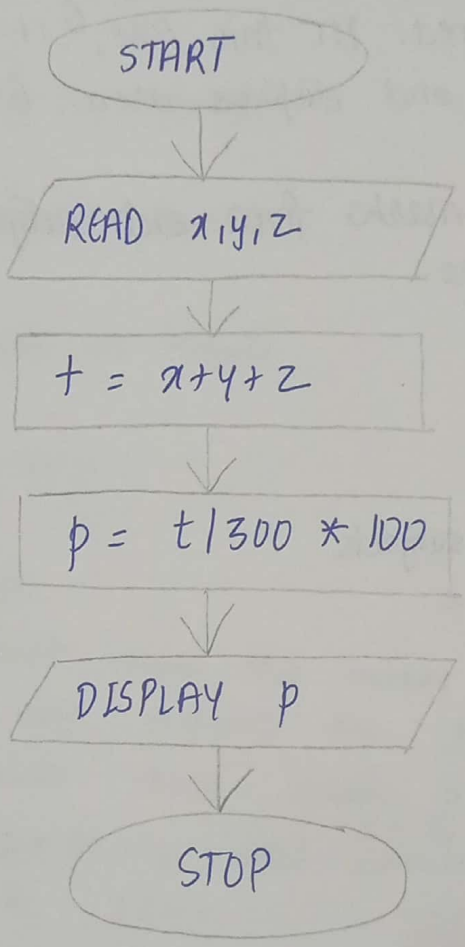
i) START
ii) READ marks of three subjects
iii) CALCULATE percentage
iv) DISPLAY percentage
v) STOP

*) Source Code:

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

void main()
{
float m,s,n,t,p;
printf("Enter marks in Maths\n");
 scanf("%f",&m);
 printf("Enter marks in Science \n");
  scanf("%f",&s)
printf("Enter marks in Nepali \n");
  scanf("%f",&n);
 t = m+s+n;
  p = t/300 * 100
```

*) Flowchart



```
    printf ("Total % = %.f \n", p);
}
```

*) Output

```
Enter marks in Maths
 69.9
Enter marks in Science
 67.8
Enter marks in Nepali
 81.6
Total % = 73.1
```

*) Description:

This program reads the marks in three subjects and calculates and displays the percentage. In this case, the program reads marks of Maths, Science and Nepali respectively and calculates the percentage totalling to 73.1%.

WEEK 4: CONDITIONALS

In week 4, we learnt about the use of conditionals and use conditional statements while writing programs.

<Q.1>: Write a program that reads a number and identifies if it is odd or even.

Ans:

*) Algorithm:

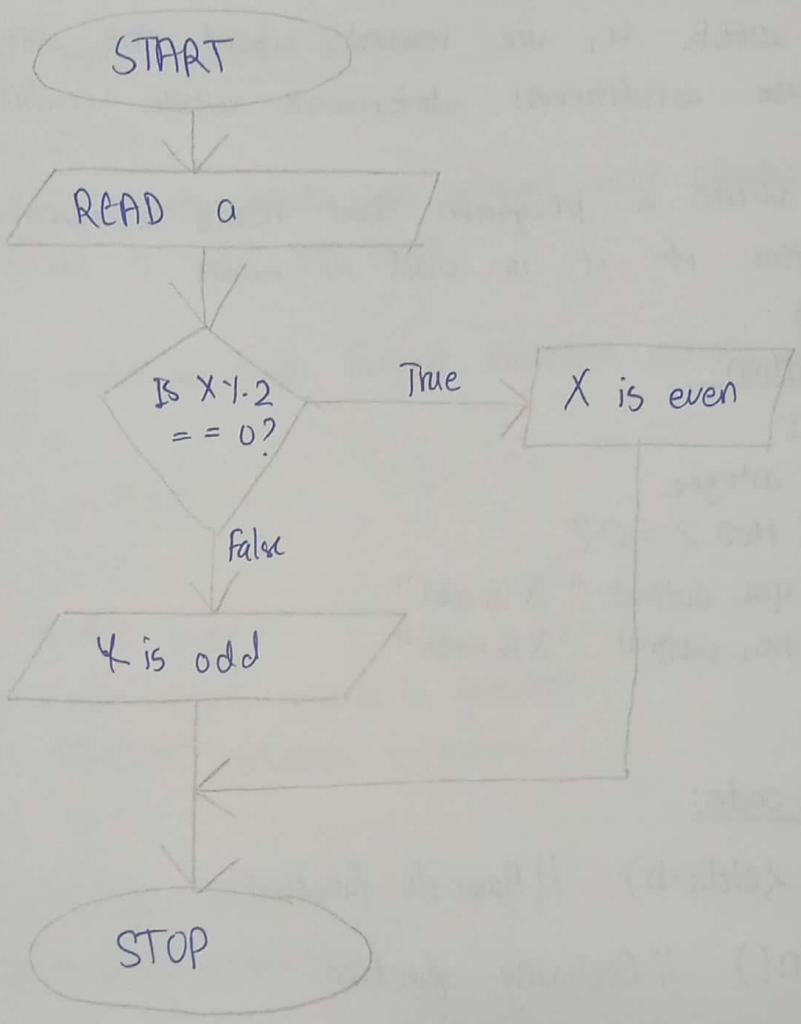
i) START
ii) READ integer
iii) IS X MOD 2 = 0 ?
    if yes, output " X is odd"
    if no, output " X is even"
iv) STOP

*) Source code:

```
#include <stdio.h>  // Basic i/o function

void main()  // Declaring function
{
int a;  // Declaring integer
printf ("Enter integer number \n");
scanf ("%d", &a);  // Reading integer.
if (a % 2 == 0);  // checking a MOD 2
{ printf ("the input number is even\n"); }
else
{ printf ("the input number is odd \n"); }
}
```

*) Flowchart :



*) Output:

```
Enter integer number
2
the input number is even
```

*) Description:

This program reads an integer and checks if the input number is odd or even.

(Q.2): WAP to find largest number among three numbers.

Ans:

*) Algorithm:

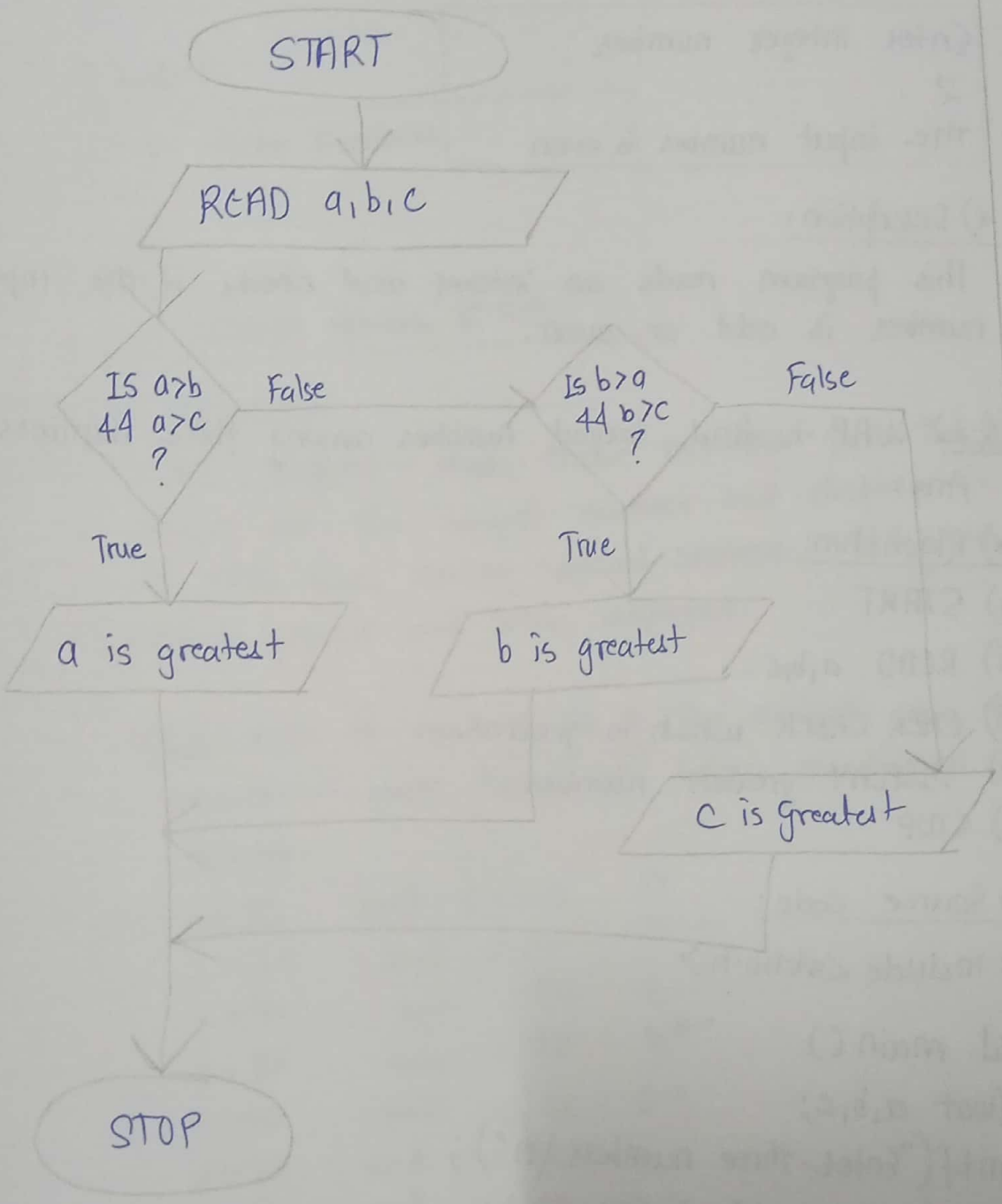
i) START
ii) READ a, b, c.
iii) ~~CHECK~~ CHECK which is greater
iv) DISPLAY greatest number
v) STOP

*) Source code:

```
# include <stdio.h>

void main()
{ float a,b,c;
 printf("Enter three numbers \n");
scanf ("%f %f %f", &a, &b, &c);
if (a>b && a>c)
{printf("The greatest no is %f\n", a); }
else if (b>a && b>c)
{printf("The greatest no is %f \n", b }
```

*) Flowchart:


START
READ a, b, c
Is a>b && a>c ?
False
True
a is greatest
Is b>a && b>c ?
False
True
b is greatest
c is greatest
STOP

```
else
{printf("The greatest no is %f\n", c);}
}
```

*) Output:

```
Enter three numbers
3
3.5
4.9
The greatest numbers is 4.9
```

*) Description:

This program reads three numbers from the user and checks for the largest number and displays the number. In this case, among entered numbers 3, 3.5 and 4.9, 4.9 is greatest and hence displayed.

<Q.3> WAP to read masks of five subjects and print the equivalent grade based on below mentioned conditions:

Range:

>=80	and	<=100	A
>=75	and	<80	A-
>=70	and	<75	B
>=65	and	<70	B-
>=60	and	<65	C+
>=55	and	<60	C
>=50	and	<55	C-
>=45	and	<50	D
>=40	and	<45	D-

Fail.

*) Algorithm:

i) START

ii) READ marks of five subjects

iii) CALCULATE percentage.

iv) CHECK Is p >=80 && p<=100 ?

display "Grade A"

Is p >= 75 and p < 80?

display "Grade A-"

Is p >=70 and p < 75?

display "Grade B+"

Is p >=65 and p<70?

display "Grade B"

Is p >=60 and p<65?

display "Grade B-"

Is p >= 55 and p<60?

display "Grade C+"

Is p >= 50 and p<55?

display "Grade C"

Is p >= 45 and p < 50?

display "Grade C-"

is p >= 40 and p<45?

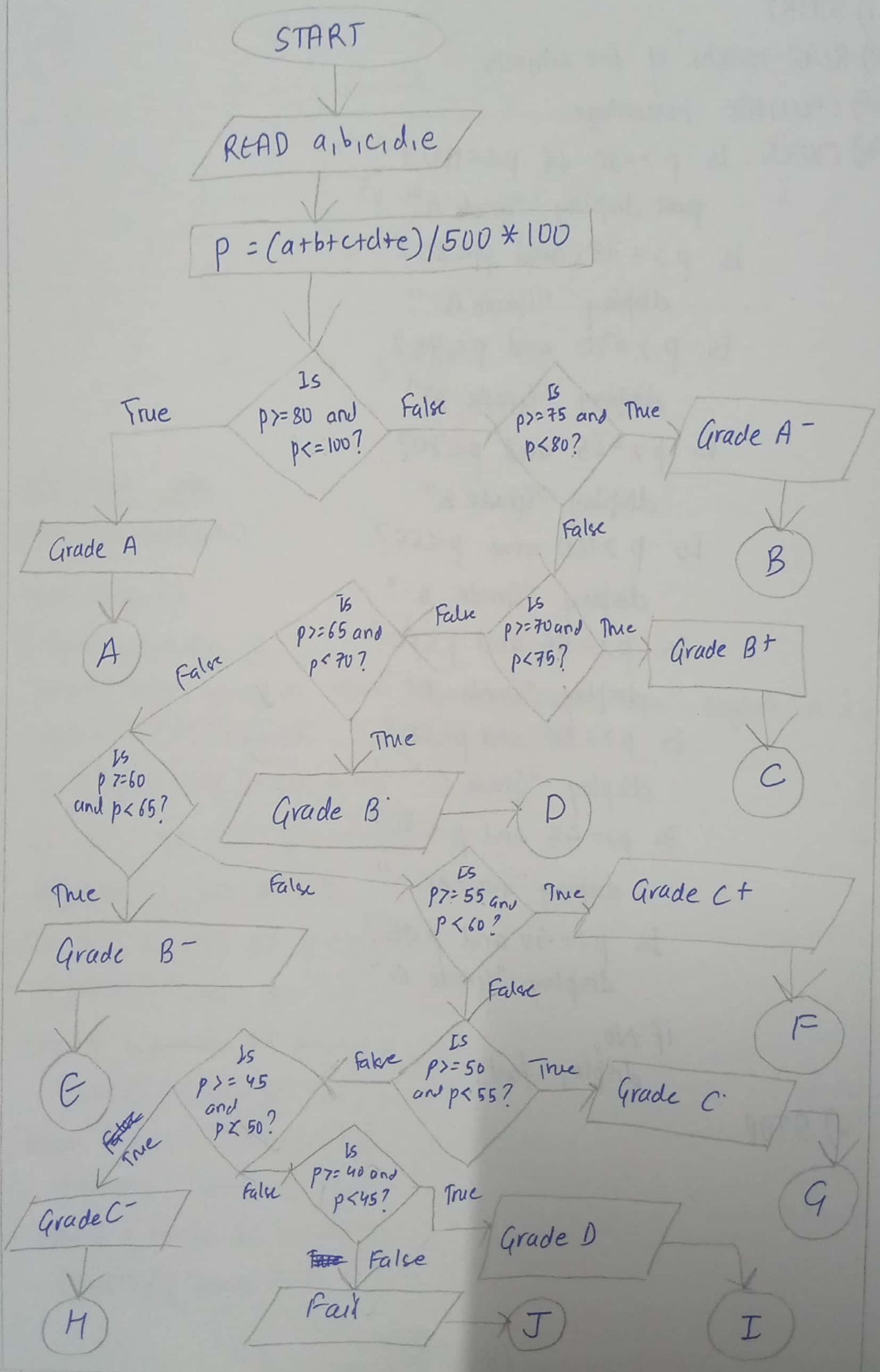
display "Grade D"

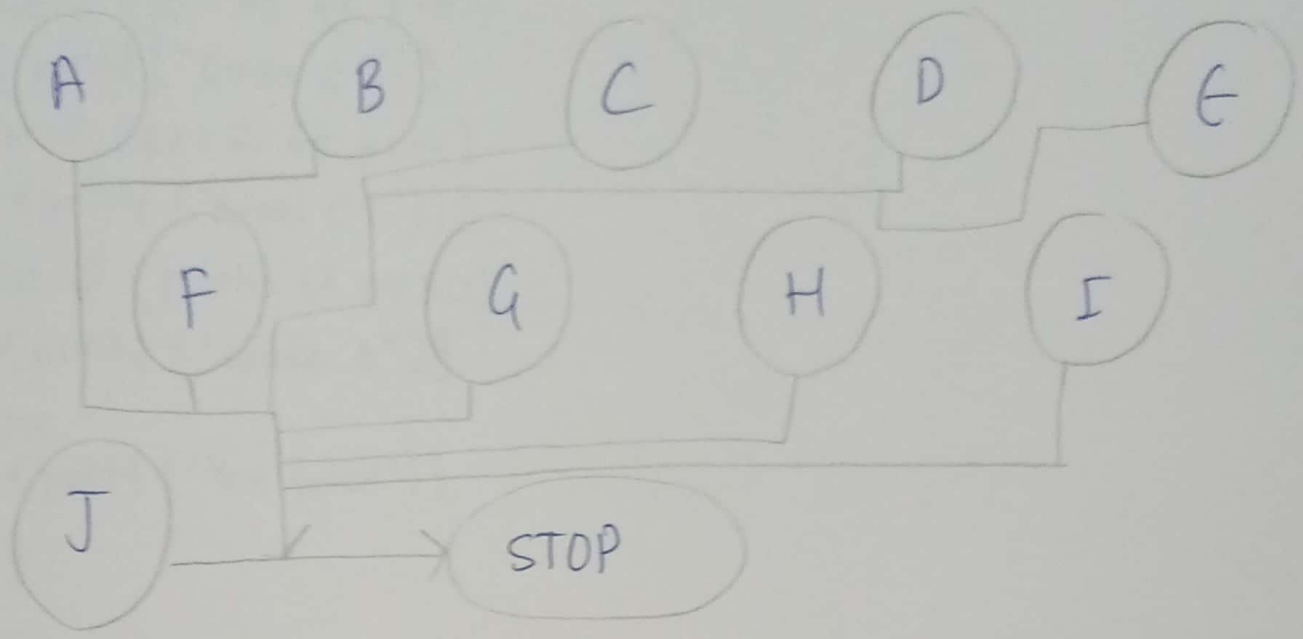
if No,

display fail.

v) STOP

*) Flowchart:


START
READ a,b,c,d,e
p = (a+b+c+d+e)/500 * 100
Is p>=80 and p<=100?
True
False
Grade A
A
Is p>=75 and p<80?
True
Grade A-
B
False
Is p>=70 and p<75?
True
Grade B+
C
False
Is p>=65 and p<70?
False
True
Grade B
D
False
Is p>=60 and p<65?
True
Grade B-
E
False
Is p>=55 and p<60?
True
Grade C+
F
False
Is p>=50 and p<55?
True
Grade C
G
False
Is p>=45 and p<50?
False
True
Grade C-
H
False
Is p>=40 and p<45?
True
Grade D
I
False
Fail
J



*) Source code

```
#include <stdio.h>

void main ()
{ float a,b,c,d,e, p ;
 printf("Enter marks in Maths, science, computer, nepali, english \n");
 scanf("%f %f %f %f %f %f", &a, &b, &c, &d, &e);
 p= (a+b+c+d+e)/500 * 100
 if (p>=80 && p<=100)
 { printf(" Grade A "); }
else if (p>=75 && p<80)
 { printf ("Grade A- ");}
else if (p>=70 && p<75)
  { printf ("Grade B+ "); }
else if (p>=65 && p<70)
  { printf ("Grade B "); }
 elseif (p>=60 && p<65)
  { printf ("Grade C+); }
```

```
elseif (p>=55 && p<60)
{printf("Grade C");}
elseif (p>=50 && p<55)
{printf("Grade C-");}
else if (p>=45 && p<50)
{printf("Grade D");}
else
{printf("You failed")}
}
```

*) Output:

```
Enter your marks in Maths, Science, Computer, Nepali, English
68
78
69.9
81.01
90.50
Grade = A-
```

*) Description:

This programs reads the marks of 5 subjects and display the equivalent rate after calculating the percentage. In this case, the input data resulted in the student receiving A- grade.