

Read in an eBook Reader for Index Navigation

(edited by Gaus Saraf)

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#SPL (Sadra Jahan - SJC)

13.02.24

G class: hpizc3u

Mark: Final - 50

Mid. - 20

assessment - 10

CT - 10

Attendance - 10

+ class performance

Ques Pattern: Assignment, CT

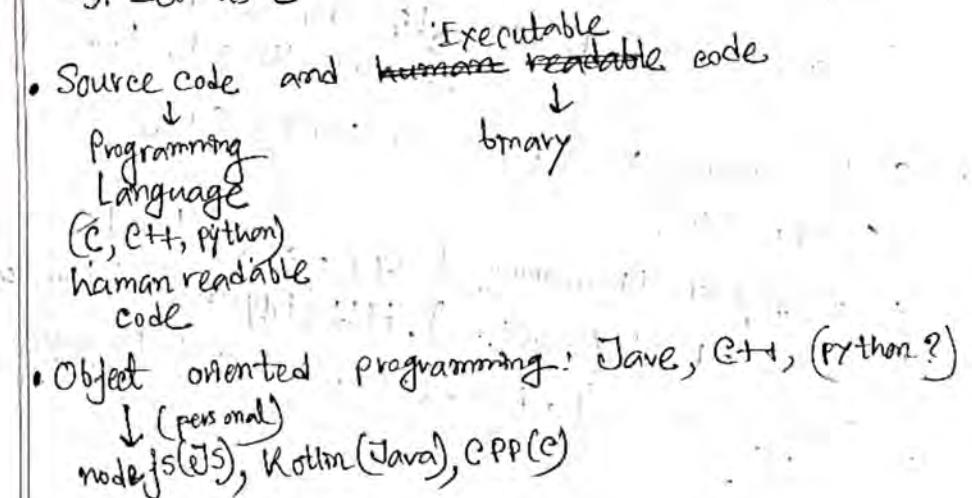
Makeup : Application for mid / supplementary exam for fin

unless mid covers passing mark, half course payment

N/A = not applicable

Reference:

1. Teach yourself C - herbert schieder (3.E)
2. Programming in ANSI C - E. Balgurusamy
3. Let us C



Q. Program? → Telling CPU what to do

ASCII = American Standard of Characters

Source code
& Executable code

human

Q. Programming language? → Source code
(human ↔ PC)
comms. medium

↓ Compiler converts

Executable code

Compiler?

PC

IDE?

.exe = executable file (skips the need for compilers)
/ converts the code by itself

Q. Programming? → Process of writing a program
/ source code.

Q. Category of Programming Lang? → LLL (Low Level Language - BCPL, ALGOL, ...), HLL (High Level Language - C, C++, Java, ...), MLL (Medium Level Language - Assembly).

C#? → Code blocks, VS code, Note++

Q. Compiler? → converts source code → machine code
checks syntax error (in the whole code)
intermediate code "object code"

Q. Interpreter? → checks source code in an ascending order (stops at first error)

Q. Tokens in programming? → common elements in every Programming Language

Keyword, Identifier, Operator, Separator, Literal

• int, do, while,
total 32 for C Lang
• color-coded

• Variable

• alphabet,
number, under-
score

• must begin with
a letter
• cannot contain
special character

• symbols
for arithmetic/
logical operation

Operand = variable

% = modulus operator, returns remainder
after dividing '2' operands (var.)

$$10 \% 5 = 0$$
$$5 \% 10 = 5 \rightarrow 10) \overline{)5} 0$$

% does not work
for float/decimals

"=" = assign/declare operator

"==" = checks if
equal or not

garbage values!

Memory allocation/declaring values for a variable

↳ when re-assigned a value, the data in memory gets re-written.

- Relational operator \rightarrow not equal

In	Out
$a = 10$	$a \neq b(1)$
$b = 5$	$a < b(0)$
	$a \geq b(1)$
	$a \leq b(0)$

0 → False
1 → True

computer takes 0 as false and others as true/1

- Logical operator

does binary operation
 \downarrow

takes 0 as false
any other number as true

" $\&\&$ " = Logical AND
"||" = OR
"!" = NOT

Ex: $a = 10, b = 5$

$$\begin{array}{cc} \downarrow & \downarrow \\ 1 & 1 \\ a \&\& b \Rightarrow 1 \end{array}$$

a	b	$a \&\& b$	$a b$	$!a$
0	0	0	0	1
0	1	0	1	1
1	0	0	1	0
1	1	1	1	0

Q. $a = 5, b = 3$

$(a > b) \&\& (a == b)$

$$\begin{array}{cc} \downarrow & \downarrow \\ 1 & 1 \\ \hline \end{array}$$

$(a > b) \&\& (a == b)$

$$\begin{array}{cc} \downarrow & \downarrow \\ 1 & 0 \\ \hline \end{array}$$

$(a < b) \&\& (a == b)$

$(a < b) || (a == b)$

$$\begin{array}{cc} \downarrow & \downarrow \\ 0 & 1 \\ \hline \end{array}$$

$!b || (a == b)$

$$\begin{array}{cc} \downarrow & \downarrow \\ 0 & 1 \\ \hline \end{array}$$

$a = b$
(as $a = 5$
so $a == b$)

Q. $(a < b) \&\& (a == b) \&\& (!a == b)$

$!(b > a) || (a \&\& (a == b)) || (b == a)$

$$\begin{array}{cc} \downarrow & \downarrow \\ 0 & 1 \\ \hline \end{array}$$

- Increment/decrement operator:

$++$ = increase by 1

$--$ = decrease by 1

- Separator

$\backslash n$ = newline/enter/ 1 line space

$\backslash t$ = 4 line space

Keyword - fixed purpose

Identifier -

Operator -

Separator - space, \t, \n

Literal - special characters

#Data type: character declare within ' ' numbers can be characters

Floating point = float

sign/unsigned char
+ve only

#Basic Structure:

{ local declaration
Statement sequence
Other function calls }

1. Including header file *
2. Macro definition
3. Global declaration
4. Main declaration * (local declarations)
5. Main declaration User defined funct

(if, then 5 needed)

```

    ↗ declaring function type
    ↗ Library function
    #include <stdio.h> // Header file, standard
    [int main()           // extension ".h") input, output
    {                   // main function declaration
        int a,b;
        printf("Hello");
        ↗ local declaration (declared inside
        ↗ statement main function)
        ↗ end line
        ↗ when code gets 0 returned,
        ↗ the code stops
    }

```

IDE → **Programz** (like Replit)

It = 4 spaces

Ex: #include <stdio.h>

```

int main()
{
    printf("Name: Saraf \n Id: ...088\n"
           "Batch: 55 \n Section: B \n Course Name:"
           "SPL");
    return 0;
}

```

file format
.c / .cpp
can run
C token

#GED

18.02.24

Reading Skills:

Reading? particular interpretation of something
comprehend something
get idea about something

Merriam Webster

what do we read? comic books

street signs syllabi, plural of syllabus

why do we read? pleasure
for information

Skills: ① Skimming ② Scanning ③ Intensive Reading ④ Extensive Reading

Ways!: ① " ② "

Purpose

① → When we read to get a general idea/overview
of a text (Maggie MacLeod)

Quick reading
get an idea of writer's intention
skimming > scanning (by complexity) cuz we organize &
remember bits
It's a fail to observe writing's sequence
look for content words or visual clues

#SPL

10.02.24

#include <stdio.h>

int main()

{

printf("*****\n*****\n*****\n*****\n");

return 0;

}

int a = ****;
printf("a\na\na\na");

int a, b, c;

a = 10;

b = 20;

c = a + b;

printf("A=%d, B=%d, and C=%d", a, b, c);

c = b - a;

printf("C=%d", c);

c = a * b;

printf("C=%d", c);

c = b / a;

printf("C=%d", c);

Q. "return 0;" needed?

=>

int a, b, result;
scanf("%d", &a);

ampersand/address off

scanf("%f", &a); → Out[~~a~~ float]
as float but will not
compiler will take input ~~not~~ store it as ~~a~~ float,
float, even tho as a is integer. will show
error

a = ();

b = ();

printf("%d", a);
printf("%d", a+b);

Q. Code for waiting for
white/set timer?
Q. Hard code?

→ Out[50]

result will not be
stored anywhere but
will be output

Q. write a C program to enter length and
breadth of a rectangle and find its area.

Q. ... Triangle... ?

① int main()

{ float l, b, area;
scanf("%f %f", &

#CHB

HW of page-18:

n	l	m	s	no(e) = 2m
4 (M shell)	0(s)	0	$\pm\frac{1}{2}$	2 = 1x2
	1(p)	0, ± 1	$3, \left(\pm\frac{1}{2}\right)$	6
	2(d)	0, $\pm 1, \pm 2$	$5 \left(\pm\frac{1}{2}\right)$	10
	3(f)	0, $\pm 1, \pm 2, \pm 3$	$7 \left(\pm\frac{1}{2}\right)$	14

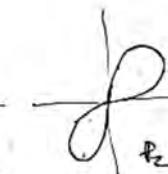
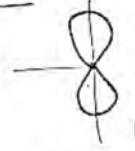
↓
Orbital
types

Orbital shapes are lab-tested results

s:

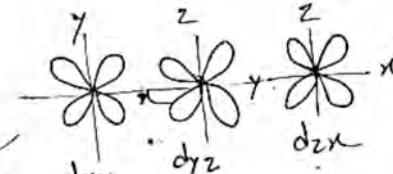
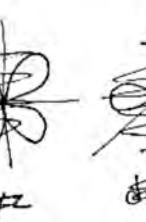
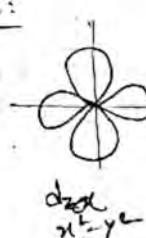


p:



Nodal plane = zone of no e⁻

d:



Shafayet Hossain (G-class) → 10
53

22.02.24

M.A. Nasrin (Masud's batch)

Imran & Tamim - Basic 97/100
Islam Hossain
3.7+ 3.9+

Onlinegdb cpbook.subeen.com

10^4 10^{18}
int → long long (%lld) } when taking
float → double (%lf) } bigger values
of this type

printf, scanf → building function

%i → standard %d

Q. integer addition, subtraction, multiplication,
division? with float

a

input

scanf("%d", &a);

printf("%d", a+b, a-b);

Md

Team Hossam H (G-class) - If, else

return 0; at line 12 ~~at main()~~ ^{void} main() first

char, int, float, boolean - basic data type

True, false

Keyword - can't declare as variable

char ch = 'z'; instead of taking input
(takes less time)
printf("%c", ch); & not needed

bool check = true

Conditional logic

Keyword: If, else If, else

at start must needed else if and else won't work without it
if() { } else if() { } else { } declares the final condition
nested if else(?) can be used for multiple conditions

• Press F2 to show error in CodeBlocks

use OR(||) instead of "else If"

for conditions with 1 or both

(Pto → 36)

BC

SPL

25.02.24

Q. Write a C program to enter two angles of a triangle and find the third angle.

→ #include <stdio.h> // standard input output header file

int main()

{

int a, b, c;

scanf("%d %d", &a, &b);

c = 180 - (a+b);

printf("%d", c);

return 0;

... ("Third angle = %d", c);

}

Q. int main()

int a = 5, b = 3;

printf("%d + %d", a+b, a-b);

return 0;

}

printf("%d", -a+b);

printf("%d %d", a>b, a==b);

Out:

8

2

↓

not stored result

-2

1 0

relational operator

Q. `printf("%d %d", (a>b)&&(a!=b), !(b>a)|| (b==a));`
 $\Rightarrow 1 \ 1$

Q. `int a=5, b=3;
 a+=b; b*=a;
 printf("%d %d", a, b);
 return 0;`
 $\Rightarrow 8 \ 24$

• movement, decrementation operator \rightarrow works differently
 $a++ \quad a--$
 $a = a + 1 \quad a = a - 1$
 $++a \quad --a$
 $a = 1 + a \quad a = 1 - a$
 $= a + 1$

Post movements/decrementation

Post "

does not work like $a = a + b$

Q. `int main()
 { int a=5, b=3, c=2;
 printf("%d", a++);
 return 0;`
 $\Rightarrow 5$

Outputs first then movements

`printf("%d %d", a++, ++a); $\Rightarrow 5 \ 7$`

(operator precedence)

`printf("%d %d\n\n", i++, ++i);`

- This statement is interesting. It prints the current value of i (which is 1) and then increments i . However, the order of evaluation of $i++$ and $++i$ is unspecified in C, leading to undefined behavior.

`i = 1;`

- This line resets i to 1. `printf("%d %d\n\n", ++i, i++);`
- Similar to the previous case, this line prints the value of i after incrementing it (due to $++i$) and then increments i again. The order of evaluation of $++i$ and $i++$ is unspecified, resulting in undefined behavior.

Basic Programming - If/else (Md Tamim Hossain) 26.02.24
(P10 → 30)

a. check odd/even

`%e(?)` → scientific notation of float

`("./6d", 9876)`

char uses single quotation → character means 1 letter
string uses double quotation → means text

compile time error → before run
runtime error → after run

C doesn't have ^a way of taking strings

`fgets()` → function for taking all
values in array

char array → (so you can use string)

++ = increment + store the value
in the incremented variable

57

27.02.24

#SPL

int main()

{

int $x=2, n=2;$
 ~~$x=x+1$~~ // $x=n, n=n+1$
printf("%d", x);
 $x = ++n;$ // $x=1+(n+1)$
printf("%d", x);
printf("%d", n);

return 0;

②
void
main?

⇒ 2 4 2

4

at first
program

stop

Programming is meant for making the computer understand

Statement and expression

endl;

no endl;

int main()

{

int $x=2, y=3;$
printf("%d", x); // 2
 $x *= y;$ // $x = x * y$
printf("%d", x);
 $x = x * y;$ // $x = (x * y) * y$
printf("%d", x);
 ~~$x *= y + 1;$ // $x = (x * y) * y + (y + 1)$~~
printf("%d", x);

18
84
72

⇒ 2 6 18 72

Condition: Structure:

```
if(expression)
{
    statements
}
else {
    statements
}
```

```
int main()
{
    int x, y = 0, a = 2, b = 3;
    if(y >= 0)
    {
        x = a;
        printf("%d", x);
    }
    else {
        x = b;
        printf("%d", x); // 3
    }
    printf("%d", x); // 3
    return 0;
}
```

indent
alignment

Q. To check a number is positive or negative?

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

```
int main()
```

```
{
```

```
int a;
```

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

```
if(a > 0){ printf("positive"); }
```

```
else{ printf("negative"); }
```

```
return 0;
```

can't
put
conditions

// without if
compiler will show
error

// without else
when if() is false
output does not show
but program finished

// If both conditions true, else doesn't count.
compiler proceeds with if condition (by default)

// when a = 0; compiler outputs "negative"

// if and if else false, by default, if else is shown

→ Block (at a time only one works)

else if; (if > else if > else)

can be used multiple times

kind of if. Q. for grading points out put?

Q. check if a number is greater, equal or less than zero?

→ int main()

```
{
    int n;
    scanf("%d", &n); // 0
    if (n > 0)
        {printf("Positive");}
    else if (n == 0)
        {printf("Zero");}
    else {printf("Negative");}
} // can use else if
// else can be omitted
```

// multiple if conditions increase runtime
 // else if reduces runtime checking all if conditions

cheching a numbers

Q. Code for grading point?

→ #include <stdio.h>

int main{

int a;

scanf("%d", &a);
 if (a <= 100 && a >= 80)

{printf("You got an A+!!");}

else if (a <= 79 && a >= 75)

{printf("It's an A, you basically failed :(");}

else if (a <= 74 && a >= 70)

{printf("You got A-");}

else if (a <= 69 && a >= 65)

{printf("You got B+");}

else if (a <= 64 && a >= 60)

{printf("B-");}

else if (a <= 59 && a >= 55)

{printf("C+");}

else if (a <= 54 && a >= 50)

{printf("C");}

80-100 A+

78-77 A

70-74 A-

65-69 B+

60-64 B

58-59 B-

50-54 C+

45-49 C

40-44 D

30 F

else if (a <= 49 && a >= 45)

{printf("D");}

else if (a <= 44 && a >= 40)

{printf("D");}

if (a <= 48 && a >= 42)

else {printf("You failed");}

else {printf("F");}

else {printf("Invalid input");}

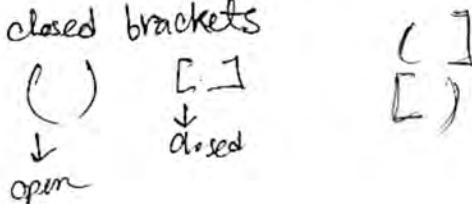
Rules of finding Domain of a function:

Polynomial, Square root, exponential, logarithm

Every R has range of $(-\infty, \infty)$

Domain for $y = \sqrt{x}$ is $D_f = [-1, \infty)$

Open and closed brackets



#SPL Lab

28.02.24

CodeBlocks

code_01.c \rightarrow int a, scanf, printf "Your lucky number is (a)"

Lab_01a.c \rightarrow printf "UIT'S"

Lab_1b.c \rightarrow printf "Name and ID"

Lab_1c.c \rightarrow sum of 2 int

Lab_1d.c \rightarrow sum, diff, mult, div of 2 float inputs

Lab_1e.c \rightarrow use formula $a^2 + 2ab + b^2$ on 2 int

Lab_1f.c \rightarrow result of $a > b$. (not if) $\Rightarrow 1$

Lab Report : file name "Student ID"
Take ss and submit in Doc file
G-class
↓
Code + output

int main()

doesn't
matter

you can use
only main()



switch is like do...
break at first repeat
else → default

Q. Summer fest Problem

Brain station, viva stop, Bkash, US Bangla (?)

Habit एवं

On site contest

#SPL

03.03.24

Q. Write a C program to input angles of a triangle and check whether triangle is valid or not?

→ #include <stdio.h>

int main()

{

float a, b, c, sum;

scanf("%f %f %f", &a, &b, &c);

sum = a + b + c;

if (sum == 180)

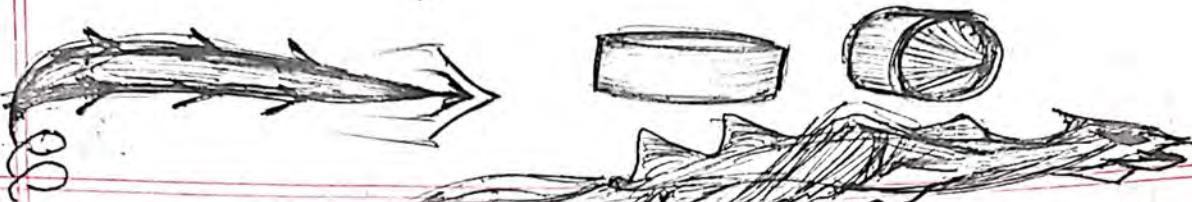
{ printf("Triangle is valid"); }

else { printf("Triangle is not valid"); }

return 0;

}

• When we write program, we are instructing the computer to do something.



log window ('build message window')

/F2

↳ Shows errors

scans. & ^(no) doesn't show error



Extra classes on March instead of mid



#SPL Lab

03.03.24

Q. Check whether a number is positive, negative or zero.

Q. Check a triangle is valid or not by taking 3 angles of triangle.

Q. Identify profit or loss by taking input

Q. Calculate grade of a marks (user input)

Lab Report must do on CodeBlocks

CodeBlocks > Plugins > Source code formatter (AStyle)

Lab Report on today's Ques

~~Ques~~ #SPL

05.03.24

Q. write a program code to check a number is odd or even?

```
#include <stdio.h>
int main()
{
    int a;
    scanf("%d", &a);
    if(a%2==0)
    {printf("even");}
    else
    {printf(" odd");}
    return 0;
}
```

Q. Write a code to check a character is upper case or lower case?

⇒ (PTO)

```

char ch;
scanf("%c", &ch);
if (ch >= 'A' && ch <= 'Z') // checks ASCII
    printf("Upper");
else if (ch >= 'a' && ch <= 'z')
    printf("Lower");
else
    printf("Null");

```

A	→ 65
Z	→ 90
a	→ 97
z	→ 128

Q. check if the character is vowel or consonant?

⇒ #include <stdio.h>

```

int main()
{
    char ch;
    scanf("%c", &ch);
    if (ch == 'A' || ch == 'E' || ch == 'I' || ch == 'O' || ch == 'U')
        printf("Vowel");
    else
        printf("Consonant");
    return 0;
}

```

62

Q.1 int x, y = 0, a = 2, b = 3;
 if (y > 0) x = a; ⇒ 3
 else x = b;
 printf("x%d", x); // if (---)

Q.2 int x = 1; ⇒ x = 0
 if (x--) { printf("Hello"); } ⇒ Friend
 printf("friend"); printf("x%d", x); // 0

Q.3 int x = 1;
 if (x--) printf("Hello"); ⇒ Hello
 if (x++) printf("Everyone");

Q.4 int x = 2;
 if (x--) printf("1");
 else if (x--); printf("2");
 else if (x--) printf("3");
 else printf("None");
 printf("x%d", x); ⇒ 1 2

$O \rightarrow f$

Q2 alt:

if(--x)
print --> friend

T F

Q3 alt:

int x = 2;
 if(x-- == 1) printf("%d", x); // checking x's truth value
 to be true
 if(x-- == 0) printf("%d", x);
 if(x-- == 1) printf("%d", x);
 printf("%d", x);

Q ...-2,-1,2,
False True

else printf("None");
 printf("%d");
 ➤ 1 2 None -1

Q. int x = 3;

if(--x); // 1
 printf("%d", x); // 2

if(--x); // 1
 printf("%d", x); // 1

if(--x); // 0
 printf("%d", x); // 0
 else if(x-- == -1) printf("%d", x); // -1

else printf("%d", x); // -1
 printf("%d", x); // -1

GT → 10 mark

short question

Nextweek Statement correction

Q. int $x = 1;$

if ($x == 0$)
printf ("%d", x); // 0

if ($x == 1$)
printf ("%d", x); // -1

else if ($x == 2$)
printf ("%d", x); // -2

if ($x == 0$)
printf ("%d", x); // -3

printf ("%d", x); // -3

Passing the value to the next
line but loop will execute

Rule PDE

$$f(x) = 2(x-3)^2 - 5$$

$$y = a(x-h)^2 + k$$

Domain: R

$$y \geq -5$$

Range:

$$[-5, \infty)$$

Q. $\ln(2x-3)+4$

$$D_f = 2x-3 > 0$$

$$x > \frac{3}{2} \quad \left(\frac{3}{2}, \infty\right)$$

$$\begin{cases} \sqrt{x-1} \\ \frac{1}{x} \\ \frac{x+1}{3-x} \end{cases}$$

Q. $f(x) = a^x \log a$

$$D_f = R$$

$$\text{Range} = (0, \infty)$$

Q. $|6-x|$

Domain: ~~R~~ R

Range: $[6, \infty)$

SPL Lab

06.03.24

Q. Odd, even

Q. Positive, negative

Q. check if a number is divisible by 5 and 11 or not.

Q. check if an alphabet is between 'K' and 'O'

Q. "

Upper or Lowercase

character is alphabet, digit or special character

Q. "

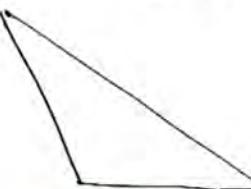
Memory input for 70 and f

↓
ASCII

→ using ASCII values of β 2-47, 58-64, 91-96, 125-126

95 25 60

120 30 30



Q. Check if Triangle is Valid or not taking angles as input? (Issues)

↓
ask for to
send code

$$\frac{a_2 \sin \phi}{a_1 + a_2 \cos \phi}$$

from (v) - (iv);

$$\begin{aligned} \frac{A \sin \phi}{A \cos \phi} &= \tan \phi = \frac{a_1 \sin \delta_1 + a_2 \sin \delta_2}{a_1 \cos \delta_1 + a_2 \cos \delta_2} \\ \phi &= \tan^{-1} \left(\frac{a_1 \sin \delta_1 + a_2 \sin \delta_2}{a_1 \cos \delta_1 + a_2 \cos \delta_2} \right) \end{aligned}$$

#SPL

10.03.24

Follow Academic calendar
 $\text{printf}("Y.d", x); // 0$

```

Q. int x = 1;
    if(x--) → 0
        printf("1"); // 1
    if(x--) → -1
        printf("2");
    else if(x--) → -2
        printf("3"); // 3
    if(x--) → -3
        printf("4"); // 4
    printf("\n%d", x); // -3
    
```

statement

expression

without curly bracket
only the first printf will be counted. ";" declares a line stop.

$\Rightarrow 1 \ 3 \ 4 \ -3$

#Nested If-else

```

if(exp)
{
    if
    else if
    else
}
else {
}
    
```

Q. int $x=0, y=1$

```

if(x==0)
{
    if(y==2)
        printf("Hello");
    else
        printf("Hi");
}
else
    printf("Friend");
printf("Nothing"); // Nothing

```

If-else Nested If-else #Ternary operator!

condition ? value_if_true : value_if_false

if true else true

int $a=10, b=20, c$
 $c = (a > b) ? a : b$ $b \text{ true}, c = b$
 $\rightarrow \boxed{c = (a > b) ? a : b}$ a, b, c
 $\rightarrow \boxed{\text{printf("i%d %d %d", a, b, c);}}$

Q. int $a=1, b=2, ans$; //With ternary operator

```

if(a==1)
    ans = 3;
else
    ans = 0;
printf("i%d", ans);

```

$\rightarrow ans = (a == 1) ? 3 : 0$

$\rightarrow ans = (a == 1) ? 3 : 0$

Nested Ternary operator:

int $a = 10, b = 20, c$;
 $c = (a > b) ? (a - 1, b - 1) : b - 0$
 $\rightarrow \boxed{c = (a > b) ? (a - 1, b - 1) : b - 0}$
 $\rightarrow \boxed{\text{printf("i%d %d %d", a, b, c);}}$

or

Switch-case-default

Next

int $a=1, b=2, ans$;

```

if(a==1)
{
    if(b==2)
    {
        ans = 3;
    }
    else
        ans = 5;
}
else
    ans = 0;

```

$\rightarrow ans = (a == 1) ? (b == 2 ? 3 : 5) : 0$

if nested if nested else else

Q. Why $\frac{d}{dx}(\text{constant})=0$??

$$\text{Q. } \lim_{t \rightarrow -2} \frac{t^3 + 8}{t+2} = \lim_{t \rightarrow -2} \frac{(t+2)(t^2 - 2t + 4)}{(t+2)}$$

$$= (-2)^2 + 2 \times (-2) \times 4$$

$$\begin{aligned} \text{Q. } \lim_{t \rightarrow -2} \frac{t^3 + 3t^2 - 12t + 4}{t^3 - 4t} &= \frac{\frac{d}{dt}()}{\frac{d}{dt}()} \\ &= \lim_{t \rightarrow -2} \frac{3t^2 - 6t - 12}{3t^2 - 4t} \quad [\text{L'Hopital}] \\ &= \frac{3}{2} \end{aligned}$$

Limits of Rational functions:

Q. (ex: 1)

#SPL

12.03.24

Q. int num1=10, num2=20;

int res;

if(num1 > num2){

res = num1 + num2;

else

res = num1 - num2;

printf("%d", res);

Q. if($n \% 2 == 0$)

printf("%Even");

else

printf("%Odd");

Q. if(num1 > num2)

printf("num1 is greater");

else

printf("Num2 is greater");

res=(num1>num2)?

res=num1+num2;

res=num1-num2;

(n%2==0)? printf("Even");
printf("Odd");

(num1>num2)?
printf("num1 is
greater");
printf("Num2 is greater");

- no ";" needed after printf() in ternary operator

- ternary operator in one line?

- ";" needed after line end (end line)

→ has ternary operator

#switch:

Syntax:

switch(expression)

works like
if()

{
case constexp : statements;
break;}

breaks
the statement

{
case constexp : statements;
break;}

checks
switch()

:
default : statements;

}

1. int x;

switch(x)

{
case 1 : printf ("The value of x is %d", x);
break;

case 2 : printf ("%d", x); // 2
break;

case 3 : printf ("%d", x);
break;

default : printf ("Other"); when
5 front.

}

character vowel or consonant (Code using switch)

Q. char C ; → anything other than character
switch(C) :

{
case 'a' = printf ("vowel"); break;
case 'e' = printf ("vowel"); break
default :

• character INT → single quote we use

#SPL

Theory questions (what
does what)

14.03.24

CT

Error correction

Write code for the given question?

Validity of variable and Why?

18.03.24 (Monday)

Syllabus upto if-else

Q. switch(x) → case works on switch()

{ case 0:
switch(y>x)
{
case 0:
case 1:

Nested switch

case 1: printf(" ");

{

switch does not have check true/false

Q. Vowel/consonant check? (switch)

break; means no to continue if true

default at \rightarrow 20

else

else if; মাধ্যম ক্ষেত্রে নির্দেশ করা হবে।

ক্ষেত্রে

other case

switch ($x \neq 0$) → continue

switch ($x = 0$) → default

• switch only works on the values.

Q. Days in a week?

Mid → 24 March ২৪৩
first exam SPL

Eng Lab

18.03.24

- Performance marking days will be announced

30 marks

- IELTS writing → $\frac{B}{10}$ mark

+ Reading

+ 5 (~~audio presentation~~)

Fahima → C.R. for Eng Lab (B2)

Performance Test on 21 March

Reading: Summary completion
T/F (NG)
Matching headings

any 2
0.5 each

Writing: Line chart

18.03.24

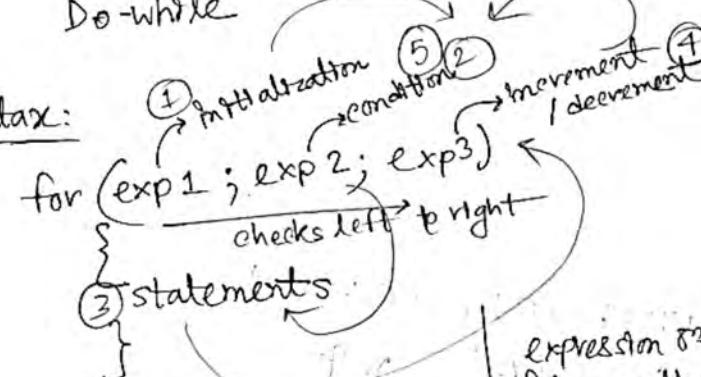
HSPL

#Loop

Loop?

for Loop
while loop

Do-while

reduces code size
" complexity
runtimeSyntax:expression result True
false result False

(a)

```
int i
for (i=1; i<=10; i++)
{
    printf("My name is x");
}
```

int $i = 5$ loop trigger (not control)

Q. for (int $y=0$; $y < 10$; $y++$)

```
{ printf("My name is x"); }
```

→ Loops forever (Infinite loop).

for (int $y=0$; $y < 10$; $y++$)
 { } 5, 6, 7, 8, 9, ...

Q. for ($i=10$; $i \leq 0$; $i--$) condition false
 { printf(); } so কোনো কিছি

for ($i=10$; $i \geq 0$; $i--$) // 11 বার output
 { printf(); }

... $i > 0$ // 10 বার output

Q. for ($i=0$; $i \leq 10$; $i = i + 2$)
 { printf(); } // 6 বার output

for ($i=1$; $i = i + 2$)
 printf("%d", i); // 3 বার

Q. Write a code to print values from 1 to 100?

```
#include < stdio.h >  

int main()  

{  

    int i;  

    for (i=1; i \leq 100; i++)  

    {  

        printf("%d", i);  

    }  

    return 0;  

}
```

#SPL Lab

19.03.24

forQ. Loop: print 1-100forQ. Loop: print Even num in 1-100forQ. Loop: print prime num in 1-100forQ. Loop: print sum of 1 to a read numforQ. while loop: print 70-50
for " : "

#SPL Lab

20.03.24

Exam Regulations:

No electronic devices

Sit roll-wise

Sign in attendance sheet

#Practice (Mod Pattern):

CT question?

()-() not valid
\$hello not valid

variable = identifier

statements are those end with semicolon ";"

a = b = 3;
 a = 3, b = 4;
 a = b = 4;

Q. int a, b;

a = -3 -- 3; // 0

b = -3 - (-3);

printf("b=%f a=%c", a, b);

Correct

Q. $\text{float } a=5 \& b=2;$

$\text{int } c, d;$

$c = \boxed{a \times b};$ mod only works for int

$d = a/2; // 2$ because floats always give 0 remainder
 $\text{printf}(" \%d \%d \%d \%d", a, b, c, d);$

$c = 1 \left\{ \begin{array}{l} 2 \\ \frac{2}{1} \end{array} \right. \text{ prints as 15}$

Q. $\text{int } a, b, c;$

$a=4, b=3;$

$c = a \& b;$

$b = a \& b // c;$

$a = a \& b // c;$

$\text{printf}(" \%d", a \backslash n);$

$\text{printf}(" \%d", b \backslash n);$

$\text{printf}(" \%d", c \backslash n);$

$\text{return } 0;$

?

1 h, invalid

total %, invalid

\$hello, invalid

$v = 3 \cdot 14 * r^2 * h$

$C, K = ((a * h) + c) + (2^3 * a * b)$

date = "2"

6 2 march OA

Q. $\text{int } i = 10, j = 20;$

~~$i = 5 \& k \neq (j = 10);$~~

$\text{printf}(" m have ...");$

$\text{return } 0;$

~~$\text{printf}(" \%d \%d \%d", i, j, k);$~~

or

Q. qwq. invalid (full stop)

Q int i=2 j=3, k,l;
float a, b;

k = $i/j*j$;

l = $j/i*i$;

a = $i/j*j$;

b = $j/i*i$;

max syllabus: 20 mark, 2 set

1, 2 (a, b, c)
↓ ↓
10 10

no options, must ans all

Do margin

answer serially when answering a question

<stdio.h> → `scanf()`
`printf()`

<math.h> → (3)

123

Q int c, a=5, b=6;

c = ++a +++b; // 13

a = ? // 6

Prep:

- Practice by selecting topic
- Definition (Concepts)

21.03.24

#SPL Lab

```

for (initialization; condition; inc/dec)
{
    statement;
}

```

initialization
while (condition)

```

{
    statements;
    inc/dec;
}

```

// for এর সব কাজ while
ফুরু করা হয়

"continue" key word for stopping
 ↳ printf(" ");

"break" keyword for stop the code (section)
loop

can use 2 variables in a same for loop

```

for (i=1, j=10; i<=10; i++, j--)
{
}

```

(there can be multiples conditions)

ex: (i = 1, j = 1; i < 10, j < 10; i++ , j++)

- 32 - SPL Lab - function
 33 - English lab - Ex. 6 + viva tips
 34 - English - Preposition + practice
 35 - Eng Lab - Listening test
 36 - Physics -
 37 - Math - Partial Derivative, In Chain Rule
 38 - SPL - function
 41 - Eng - presentation + preposition (113-1L3, Raymond Murray)
 43 - Chem - H-bond, Lewis structure
 45 - Phy - Thermodynamics chapter, 1st law
 48 - Chem - Hybridization (sp^3 , sp^2 , sp) + HW
 50 - Phy - CT + HW + Work done, Isothermal, Adiabatic
 52 - Eng - Notice \rightarrow UP Survey + no presentation
 Math \rightarrow The Extreme value theorem
 54 - Eng lab \rightarrow Last classes - Lang: Read / write / listen + viva
 Physics \rightarrow
 55 - Math \rightarrow Rolle's theorem (Mean value theorem)
 57 - SPL \rightarrow String
 60 - Eng \rightarrow Transformation of sentences + Picture story
 62 - Chem \rightarrow VSEPR theory, MOT, Chemical (Task)
 1st order derivation and half life
 67 - Phy \rightarrow Carnot's Engine, cycle, efficiency
 69 - SPL \rightarrow Str
 73 - Phy \rightarrow
 75 - Chem \rightarrow 2nd order reaction

SPL

02.04.24

Loop structure:

#include <stdio.h>

int main()

{

return 0;

}

Loop?

(i) initialization

(ii) condition

(iii) inc/dec

initialization;

-for(; condition; inc/dec)

while Loop:

initialization
while (condition)

{

statement(s)

inc/dec

}

for Loop:

for (initialization;
condition; inc/dec)

{

statement(s)

inc/dec

}

do-while Loop:

do {

statement(s)

inc/dec

}

while (condition);

Q.

```

int = 5;
for ( ; i=6; i++)
{
    printf("Loop");
}

```

→ re-assigns and checks 0/1
i=6 → assign
i=6 → compare
(a) for(; i==6; i++)
 ⇒ false

⇒ Loops infinitely

(d) for(; i>=5; i++)

⇒ Loops infinitely

(e) for(; i;)

⇒ Loops infinitely

Q.

```

int i=5;
while(i)
{
    printf("Loop");
}

```

⇒ prints infinitely
i++ → Loops infinitely

(c) { printf()
 }
 ⇒ 5 times

(a) while(i)
 {
 i++
 printf("Loop")
 }
 ⇒ Loops until 0
 { 5 times }

(d) while(i)

```

{
    printf("%d", i);
}

```

⇒ 43210

Q. int i=5; //i=0

```

do {
    printf("%d", i);
    i--;
} while (i);

```

(a) ⇒ prints infinitely

#break: (stop)

Q. int i=5, count=0;

while(i)

```

{
    count++;
    printf("Loop");
    i++;
    if (count==5)
    {
        break;
    }
}
```

printf("%d", i);
 ⇒ 10

continue: (skip)

Q. int i=5;

int count=0;
 while(i) → Loops without
 { i-- }

```

{
    if (i==3)
    {
        continue;
    }
    printf("Loop");
    i--;
}
```

printf("%d", i);
 ⇒ (Loops infinitely)


 Chemistry

02.04.24

```
(a) { i--;
    if (i == 3)
    { continue;
    printf("Loop");
    }
    printf("%d", i);
}
⇒ 4x Loop
```

while can assign/
check condition.
while works like
condition
if()

Q. (i) int x = 5; ⇒ 43210
`for (; x-- ;)`
`{ printf ("%d", x); }`

(ii) int x = 1; ⇒ 12345678910
`do{ printf ("%d", x);`
 `x++;}`
`while (x <= 3);`

(iii) int x = 3; ⇒ 3210
`do{ printf ("%d", x); }`
`while (x--);`
`printf ("%d", x);`

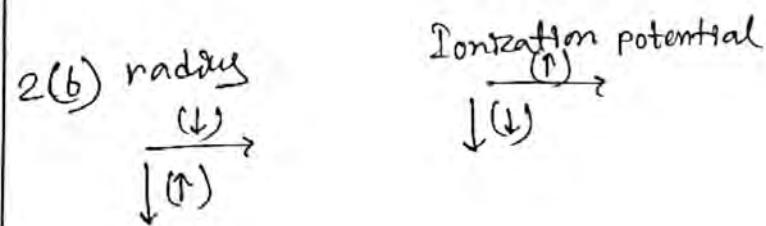
(iv) int x = 5; ⇒ 543
`while (x - 2)`
`{ printf ("%d", x - 2); }`
 checks 0/1 for $3 \geq 5 - 2$
 but x = 5 remains

Mid question:

1(a) (Elemental Zoo)

should write about periodic properties (S, P, d, f)
or e- config.

- chemical solution chapter **excluded** from final syllabus



SPL Lab

03.04.24

Assignment: get fgot

User Input

condition

loop

for/while

} possible problems in C

switch(ternary)

first write
expected
output

Q5 $\rightarrow 5 + 10 + 15 + \dots$ up to 75 the term.

Q1. (loop) sum of even num 1-100

Q2. print $7+20+33+\dots+n$ and sum using loop.

Q3. print 'v' for vowel, 'c' for consonant and
Count their findings.

Q4.

Lab Report!

~~Q₇ = for i=1; i<=3;~~

Ans: 1 1 1 2 1 3 1 4
2 2 2 3 2 4
3 3 3 4
~~4~~

Assignment Cover Page:

Name : Imtiaz Ahmed

Designation: Lecturer

SPL

16.04.24

#

Class VIII 19 May
Lab Final (Lab test?)
 \downarrow
3-4 OT
 \downarrow 17 April

-Till Loof

17 April

2A

Q. Prime or not?

Loop until the increment number is divisible and remainder zero. if zero then break; the loop.

```
for(i=2; i<n; i++)  
{ if(n % i == 0) break;  
}
```

```

if (i==n) { printf("Prime"); }
else { printf("Not Prime"); }

```

Q. Prime number series 2

int i, j, n;

```
f1 / i=1 : i<=5 ; i++)
```

```
{ printf("The value of i is %d", i);
```

```
for(j=1; j<=3; j++)
```

```
{ printf ("The value of j is %d\n", j); }
```

```
printf("\\n\\n");
```

$$\begin{array}{c|c} i \rightarrow 1 & j \rightarrow 1 \\ \downarrow & \downarrow \\ i \rightarrow 2 & j \rightarrow 2 \\ \downarrow & \downarrow \\ i \rightarrow 3 & j \rightarrow 3 \end{array}$$

1317

۱۷۵

j→

Vi → A j →

11

7

1 → 1

j-3

Q. int i, j, n;
 for (i=1; i<=5; i++)
 { printf(" "); }
 for (j=1; j<=3; j++)
 { printf("*"); }
 printf("\n\n"); }



"Try to get the estimated output."
 "Follow Book"

#Array

- List of variables which are all of the same type and are referred through a common name.
- An individual variable of an array is called an "array element".

int x[10] \rightarrow Byte size (element number)
 default initial array element $x[0]$ \rightarrow element/value of the array
 declared array of size 10
 index numbers
 $x[0]=5, x[1]=10, x[2]=20, x[3]=30, x[4]=40, x[5]=50;$

or, scanf("%d", &x[2]);

or, for(i=0; i<10; i++)
 { scanf("%d", &x[i]); }

Can't take more input than the declared size/count

or, for(i=1; i<=10; i++)
 { scanf("%d", &x[i]); } \rightarrow ignoring x[0]
 for(i=1; i<=5; i++)
 { printf("%d", x[i]); } starting/working with x[1] and later

Q. Please Enter 5 values:

10
20
30
40
50

The values of the array are:

A[1]=10
A[2]=20
A[3]=30
A[4]=40
A[5]=50

(?)

(?)

a[] = { , }

\downarrow Does it work in code blocks?

printf("enter 5 values:");
 int a[5];
 for(int i=0; i<5; i++) \rightarrow printf must be present
 { scanf("%d", &a[i]); }
 : printf("values of the array are:");
 for(int i=0; i<5; i++)
 { printf("A[%d] = %d", i, a[i]); }

Should work without declaring 2nd time

for(int j=1; j<=5; j++)
 { printf("\n A[%d] = %d", j, Array[j]); }

a[] = { 0, 1, 2, ... }
 1 2 3
 position
 index number

deduct

Q. sum, subtract, multproduct, divide using
array?

$$= \frac{m}{3N} nc^2$$

$$= \frac{mc^2}{3N}$$

$$\therefore Pv = \frac{1}{3} mnc^2$$

$$P = \cancel{\frac{1}{3}} Mc^2$$

$$P = \frac{1}{3} pc^2$$

$$C = \sqrt{\frac{5P}{c}}$$

SPL Lab - Array

17.04.24

a	0	1	2	3	4
	5	10	20	7	100

max = a[0]

Next Day - Lab test

Next Month - Lab final

Tasks: sum, deduct, product, divide using array

Q. find average of numbers?

Q. find the biggest value between 5 numbers?

Q. Write a C program to find a number from a list of numbers as given below:

$$n[5] = \{3, 5, 7, 2, 9\}$$

Q. "

" (alt) (string)

Q. find 'a' in char array "Bangladesh"

Q. " and replace 'a' with 'z' and print the char array

Q.

Search/find

position/index

Count

Edit/replace

- What is an array? Why use array?
- Why use variable for storing data?

address

Position → 1 2 3 ... 50

Index → 0 1 2 ... 49

X [10 | 5 | 7 | 20 | 22 | 33]

(Memory) location ↑ 4656 4658 4660 4662

(?)

Q. Search input value inside an array? (20,?)

search = 20

```
⇒ int i;
for (i=0; i<=5; i++)
{
    if (x[i] == search) { printf("Found"); }
    break;
}
```

⇒ search = 50? int flag = 0;

```
(") for( ) {
else if { if { flag == 1) { printf("Found"); }
else { printf("Not found"); }}
```

final PDF
loop pattern

ask me for
context
and make PDF
No need
finishing
first

Q. Search = 10?

```
flag = -1; // so that it  
           differs from  
           the index no.  
for() {}  
if(flag >= 0)  
    found
```

Pattern no. 2 (2nd)

Odd
even
odd
even

Q. Search = 50?

i = 6 // code stop?

```
int i;  
for(i = 0; i <= 5; i++)  
{ if(x[i] == search)  
    { break; } }
```

if(i < 6)
 found
else
 not found
// If the result is found, it'll be
// found with this.

Q. replace?

```
int i;  
for(i = 0; i <= 5; i++)  
{ if(x[i] == search)  
    { x[i] = 100; } }
```

for Loop can use
multiple variables
for(i = 1, j = 1; i >= 0, j >= 0;
 i++, j++)

[fix previous note]

Boek

Raymond Murfy

W.R. Rennert Highschool Eng 104

21.04.24

25

English

#Preposition

#Noun & other preposition use:

- Although

Ex: Although it rained a lot, they had a good time.
I did not apply for the job, although I did have the necessary qualifications.

2. # I did not have after Although we use [subverb]

We went out although it was raining heavily.
We did not go out because it was raining heavily.

3. In spite of / Despite: (+ verb + ing)

Ex: In spite of the rain, we had a good time.

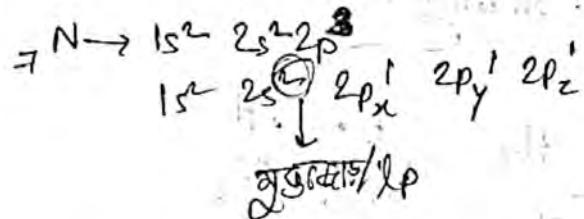
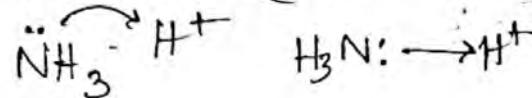
She was not well, but in spite of this she continued working.

In spite of what I said yesterday, I still follow you.

I did not apply for the job, in spite of having the necessary qualifications.

Type (special)

① Co-ordinate bond (স্থানীয় সম্পর্ক দ্বারা গঠিত)



Ex: যাকাৎ

pure covalent bond

Polarity chart? \rightarrow Hazar Nag

Metallic bonds: delocalized electron?
positively charged

restricted spaces

SPL - Function

23.04.24

function \rightarrow main(), scanf(), printf()

scanf, if, else \rightarrow these are keyword

Library functions are pre-defined, we only call them
by header file

(invoke them)

by adding header file

User-defined function:

used like loops, just
"called" when needed
the same set of codes

reduces size, runtime

function declaration:

function prototype? defined before main
function.

local variables are defined for individual functions

Lab test 2

#include <stdio.h>

int sum(); // function prototype, function name.

int sub(); // declaration

int Multiplication();

int Division();

int main(){

printf("\n I am from Main function");

sum(); // function call

sum();

//sub();

//Multiplication();

sub();

return 0;

}

int sum() // function with body

{ printf("\n I am from function SUM");

int a, b, result;

scanf("%d %d", &a, &b);

result = a + b;

printf("\n The value of summation is:
%d", result);

return 0;

}

int sub()

{ printf("\n I am from function subtraction\n");

int x, y, result; // local variable

scanf("%d %d", &x, &y);

result = x - y;

printf("\n The value of subtraction is: %d", result);

result = return 0;

}

int Multiplication()

{ printf("\n I am from function Multiplication");

return 0;

}

int Division()

{ printf("\n I am from function Division");

return 0;

}

Lab
SPL - function Prototype

24.04.24

Q. Prototype declare at pos of compilation time

\downarrow
 main() go
 other user-defined function [function definition]
 decrease pos

Call by value?

parameter / argument

In this str:

adding extra library file will increase file size

void has no return type (does not require return)

void fun1() { } does not accept or return values

int fun2() { } must; otherwise you can't
 return 0; use this (error)

Q. void data type

void func()
 int main(void)
 {
 return;

P955

Implicit differentiation

Implicit form?

$$\frac{dz}{dx} = \frac{\partial f}{\partial x} \frac{dx}{dn} + \frac{\partial f}{\partial y} \frac{dy}{dx} = \frac{\partial f}{\partial n} + \frac{\partial f}{\partial y} \frac{dy}{dx}$$

OCT - Partial Derivative, chain rule

SPL

28.04.24

```
Q1 int main() { int i, n, res = 1;
    scanf("%d", &n);
    for (i = 1; i <= n; i++)
    {
        res = res * i;
        printf("The factorial of %d is %d", i, res);
    }
    return 0;
}
```

In: n=5

Process:

- res = 1; $\rightarrow i=1$
- res = 1 * 1 = 1
- res = 1 * 2 = 2
- res = 2 * 3 = 6
- res = 6 * 4 = 24
- res = 24 * 5 = 120

Out:
The factorial value
of ~~5~~ 5 is 120

Lab report?

- delete: replace with \backslash / swap the position
 - position of index number
 $0, 1, 2, 3, \dots$
 - $1, 2, 3, \dots$
- Perfect numbers?
 - (WTF)
 - math function
 - ask maram

$\sqrt{2}$
 \sqrt{n}
~~24~~
 Pow(5, 2)

#functions Library / pre-defined function

wrdc()
 function structure

Q2 (modified Q1)

int n, int res
int factorial() {
 for (i=1; i<n; i++)
 { res = res * i; }
 return res; }

int main() { int i, n, res=1; //local variable

scanf("%d", &n);
 res = res * i;
 printf("The factorial value of %d is
 %d", n, res);
 return 0; }

Scansf("%d", &n);

res = factorial(n, res); //call by value

printf("%d", res);
return 0; }

skipk printf("%d", factorial(n));

• void = null (type return)

local & global variable

Q. Does serial matter in function arguments? parameters

→ If serial 1 is 1000 & serial 2 is new val input
2nd/declared 2nd

Q. function prototype declaration?

→ declare user defined function

when you write them after/below main function
so the compiler knows to search for them after
main() when called, otherwise compiler will
show error as it can't find the user-defined
function.

Q. Verify Rolle's theorem for the function

$$y = x^2 + 1, a = -1 \text{ and } b = 1.$$

Sol: The function $f(x) = x^2 + 1$ is a

polynomial function, is continuous on $[-1, 1]$
and differentiable in $(-1, 1)$.

$$\text{Also, } f(-1) = (-1)^2 + 1 = 2$$

$$f(1) = (1)^2 + 1 = 2$$

Hence, the function $f(x)$ satisfies all conditions of Rolle's theorem.

$$\text{Now, } f'(x) = 2x \rightarrow \frac{f(b) - f(a)}{b - a} \geq 0$$

$$f'(0) = 0$$

$$\Rightarrow 2c = 0$$

$$\Rightarrow c = 0, \text{ when } c \in (-1, 1)$$

Hence, Rolle's theorem is verified

(Ans.)

SPL

OB.05.24

#Lab test?

higher level than classwork

#String

- "A string in C programming is a sequence of characters terminated with a null character '\0'. The C string is stored as an array of characters."

Char Str[] = "Geeks"

include
<string.h>

C string initialization:

1. Assigning a string without size. Char Str[] predefined = "Geeks"

2. " " with a size. Char Str[10] = "Geeks"

3. " " Character by character with size. Char Str[10] = { 'G', 'e', 'e', 'k', 's' }

4. " " " " without size. Char Str[] = { 'G', 'e', 'e', 'k', 's' }

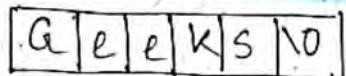
↳ 5 letters, 6th has "\0"

Need to declare
header file.

String vs character

- ends with a "null character" or, "\0"
- string is a kind of character array

char str[] = "Geeks"



space is counted as character.

(space character ASCII 32)



String functions

char str[] = "Hello Bangladesh",

printf("%s", str);

→ character input?



With built-in function:

define → char str[50] ↗
gets(str); ↗ *input library function*
putstr(str); ↗ *output library function*
scanf(" "); ↗ *search all for string*
fgets()); ↗

Q. How to get string length (size)?

→ (using loop)

char str[50] = "Hello Bangladesh";

printf("%s", str);

count = 0;

for (i = 0; i < 50; i++)

{ if (str[i] == '\0') // count until string
ends with '\0'
break;

else
count++;

} printf("%d", count);

(alt) → using function strlen(str); (string length)

int count;

count = strlen(str);

printf("%d", strlen(str));

"sizeof(.)" counts
the byte size,
not the index
size

(??)

↓
Memory address
topic

Q. একটি char array input কোথায় লেখা?

char str[50], dest[30];

(manually) \Rightarrow for ($i=0; i < 50; i++$)

```
{ if(str[i] == '\0')  
    break;  
else  
    dest[i] = str[i];}
```

(alt) \Rightarrow (using function) ~~strcpy(str)~~
strcpy(dest, source);
↓
strcpy(dest, str);

Q. Merge?

\Rightarrow char str[50] = "Hello";
char str[50] = "Bangladesh";

(concatenation) strcat(dest, str);

dest = dest + str
(no space)

works with
only 2 array
(can't type strcat());
3rd array =

Q. reverse?

strrev(dest);

Consult:

- Problem উৎসা (extra task) not necessary,
problem solve enough
as much as possible
- Participate contests, contests এর জন্যে হাত দয়া কর
(even Lab test)
- Make team for contests
- C is enough for contests but C++ is better.
gotta practice more to get better at C for contests.
-

SPL

07-05-24

- 12 May, Time: 01:30 - 02:20

2nd Class test

Syllabus: Ternary, Loop, switch,
break, continue.

- 14 May, Time: 09:40 - 10:30

3rd Class test

Syllabus: Array, function, string

Library function (String)
null terminator "\0"

#Function of String

- `strlen()` // calculate the length of string
- `strcpy()` // copies a string to another string
- `strcat()` // concatenates two strings
- `strcmp()` // compares two strings
- `strlwr()` // converts string to lowercase
- `strupr()` // " " uppercase
- `gets()` // take input as string
- `puts()` // print output of string
- `strrev()` // reverses the string

works
with 1
value

Ex:

`char str[20], dest[20]`

Ex: `x = "so com puter";`

`int n = strlen(x);`

= 9

Ex: `char x[20], y[20];`

`strcpy(y, x)` // value copies from x to y

`strcat(x, y)` // $x = x + y$

Ex: `strcmp(x, y);` // $x - y$

$x = \boxed{A B C}$
 $y = \boxed{B A C}$

counts only the first character

$x = y \Rightarrow 0$

$x > y \Rightarrow 1$

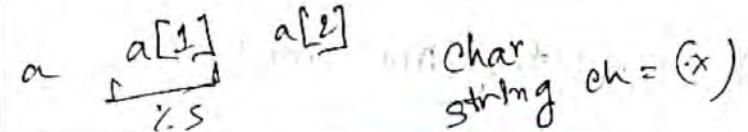
$x < y \Rightarrow -1$

++ & $\frac{1}{2} + 1$, same?
± sign?

#Shakil collected questions:

- Q. (function) swapping values
Q. decimal to binary
Q. program
Q. calculate $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Q. Mandelbrot approach?
Q.
 *
 * * * *
 * * *
 * *
 *

Q. Pascal's triangle



char string ch = (x)

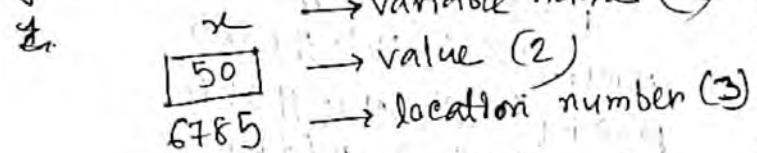
44
pointers

Ex:

```
int x;  
scanf("%d", &x); // x = 50  
printf("%d", x); // 50  
printf("%d", &x); // 6785
```

- garbage value = memory location number

- 3 things happen when declaring a variable:



- usage:
 - passing array as argument
 - string usage (string manipulation)
 - organized complexity

- pointer → *

- working with location numbers instead of variables. (more secure)

collect lectures from other section

Ex: 116785

```
printf("x=%u", &x); // %u = unsigned integers  
{ printf("x=%d", x); // 50  
{ printf("x=%d", *(&x)); // 50
```

Ex:

V	P
2	6785
6785	3275

p now works as a pointer variable,
int x=2, (*p);
p = &v; // v's address assigned to p.
printf("%u", &v); // 6785
printf("%u", &p); // 3275
printf("%u", v); // 6785
printf("%u", *(&v)); // 2
printf("%u", *p); // 2
printf("%u", *p); // 2, (&v points to what)

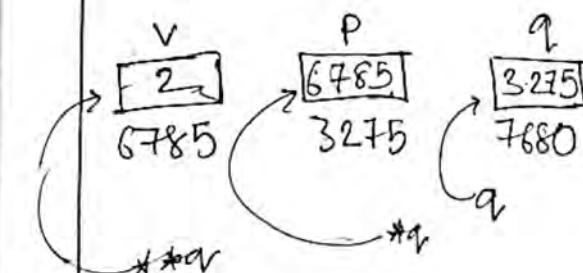
%u → using only positive int. location number can be but + =

memory address=location

pointer of a pointer

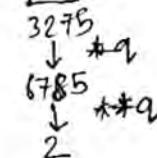
Ex: int x=2, *p, **q;

p = &x; // points toward what &x points at
q = &p;



- printf("%d", &v);
- printf("%d", *(p));
- printf("%d", *p);
- printf("%d", *q);
- printf("%d", **q);

- 116785
- 116785
- 116785
- 116785
- 116785



Lab test

v=2

Structure (struct var)

Q. int main() { printf("Hello world"); }

{ int x=2,y=3,*p,*q;

$$P = \& x; //$$

$q = \sum y_j^j$ (for $j \in J$) shall be strong.

$$p = q;$$

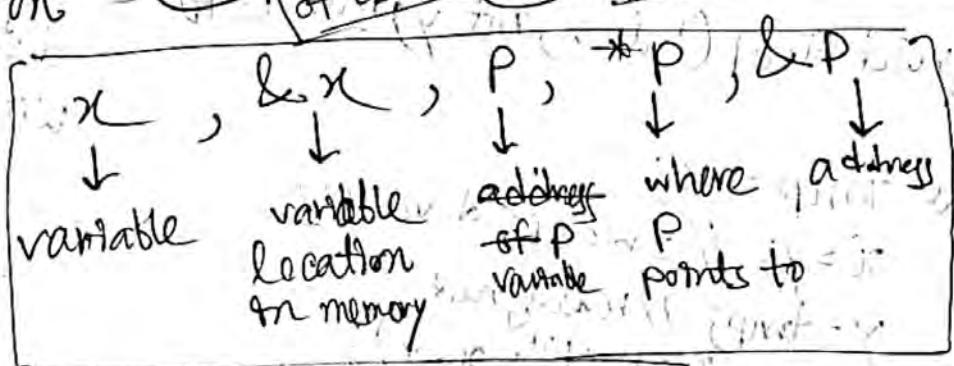
```
printf("%d %d %d %d", x, y, *p, *q);
```

~~112, 2, 3, 4~~

~~3, 3, 3~~, 4

4, 4, 4

- Memory locations are random (টোকি ফার্ম)
 - runtime ?
 - exe runfile saved as
 - they allocate where (generate) variables are declared
 - compile time ?
 - iteration of code run
 - build and compiled



call by value? \Rightarrow passing arguments
parameters

a. write a code to swap/ interchange

two values? Ex: $x=10, y=20$

after execution

$x=20, y=10$

$\Rightarrow \#include <Stdio.h>$

```
int main()
{
    int x=10, y=20, tmp;
    printf("%d %d", x, y);
    swap(x, y, tmp);
    return 0;
}

void swap(int x, int y, int tmp)
{
    int temp = x;
    x = y; // swapped values
    y = temp; // reassigned
    printf("%d %d", x, y);
}
```

swap(x, y, tmp)

math() does not execute it so better to declare inside user-defined function

Amd syllabus: loop

function

Array

Pointer

Recursion

structure

(Bitwise, boolean
পার্সানা এবং না)

SPL - Call by Reference → Passing locations

14.05.24.

```

Q. int main()
{
    int a, b;
    scanf("%d %d", &a, &b); // 100 200
    swap(&a, &b);           printf("A=%d, and, B=%d", a, b);
    printf("%d %d", a, b); // 200 100
}

int swap(int *P, int *q)
{
    int temp = *P;           ] works with memory locations
    *P = *q;                hence no return is necessary
    *q = temp;
} // return 0;
  
```

- user-defined function, is not predefined
- **Global variables** are declared outside ^{the} main function examples?
- Should I draw memory locations before code

Q. int main()

{

→ No helping anyone

Task / Assignment → 5 marks

find Questions from each topic

and Submit → Sunday

Mixed topics;

Function

Loop

array

Recursion

Q. int fact(int m);

int main()

{ int n;

scanf("%d", &n); // 5

printf("%d", fact(n)); // 120

}

int fact(int m)

{ int f, s=1;

for(f=1; f<=m; f++)

{ s*=f;

}

return s;

}

$$1 \times 1 = 1$$

$$1 \times 2 = 2$$

$$2 \times 3 = 6$$

$$6 \times 4 = 24$$

$$24 \times 5 = 120$$

Q. int fact(int m);

int main()

{ int n;

scanf("%d", &n);

printf("%d", fact(n));

int fact(int m)

{ if (m==1)

return 1;

else

return m*=fact(m-1);

}

can do loop
/ replace loop operator

↑

↑

recursive
function

recursion

↑

5x4!

4x3!

3x2!

2x1

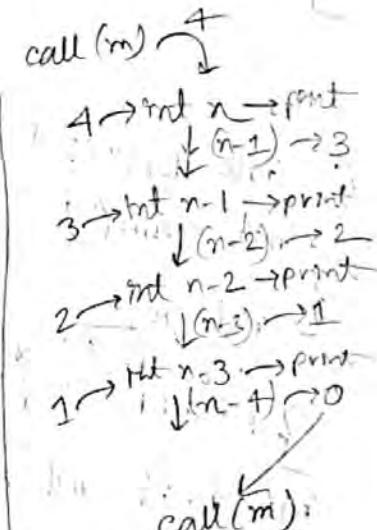
Recursion < loop + function
structure < Array + variable

103

Q. How many values can a user-defined function return?
→ 1 at a time

Q.
int main()
{
 int m = 4;
 call(m);
}

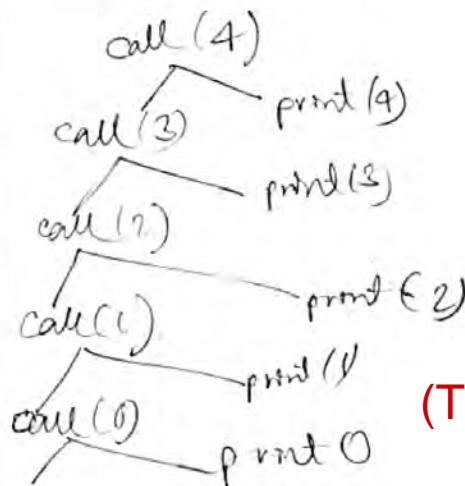
int call(int n)
{
 while(n > 0)
 {
 printf("%d", n);
 call(n-1);
 }
 return 0;
}



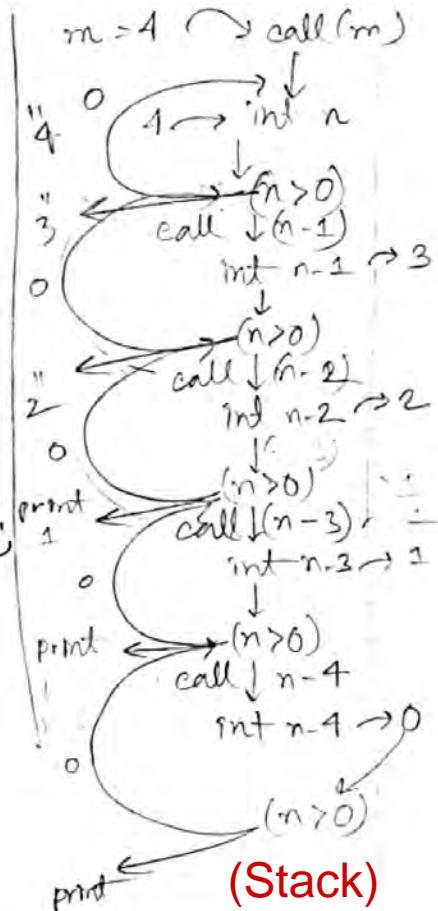
out:
4321

Q. int main()
{
 int m=4;
 call(m);
}

int call (int n)
{
 if (n > 0)
 call(n-1);
 printf("%d", n);
 return 0;
}



(Tree)



In case of character array, newlines ~~take~~
Count against array size.

Q1. Array

1. Write a C program to take 5 values as input in array and print the entered value from that array.

2. " to take input 5 values in 2 arrays.

Ex: A[5] = {10, 20, 30, 40, 50}

B[5] = {50, 40, 30, 20, 10}

and the 3rd array will be calculated from the given two array like:

C[5] = {40, 20, 0, -20, -40}

• Array size?

int A[5] → Index 0-4
~~Index 5~~

Char A[5] → Index 0-4
~~Index 5~~ → per index 4 bytes

Q. (String)

1. String length manually
2. String copy manually
3. String compare
4. string concat (strcat(destination, source))
5. string rev (strrev(source)).

Q. (recursion)

- 1.

Lab final → all

Extra days



→ depending
on the
day off,
schedule will
change

#Structure → variable array

- Structure is a collection of group of variables, possibly different types.
- The struct keyword is used to define the structure in the C language.
- The items of the structure are called its members; and it can be any valid data type.

Syntax:

```
struct Structure_name{  
    data_type member_name_1  
    "           member_name_2  
    . . . . .  
    };
```

Structure
declaration

variable
declaration
of a
structure

↓
structure
type variable

Ex:

```
struct student_info{
```

```
    char name[25];
```

```
    int id;
```

```
    char subject[20];
```

```
    float number[20];
```

```
    float result;
```

```
} std1, std2, std3;
```

```
(or) std[50];
```

declaring
right after
declaring
struct

instead of

(or) struct student_info : std1, std2;

③ ↓
declared after
declaring the structure

```
std1.name = "Ajay";
```

(or) scanf("%c", &std1.name);

scanf("%c", &std2.name);

used in array

(or)

```
for (i=1; i<=3; i++) {
```

```
    scanf("%c", &std[i].name);
```

- Structure is a user-defined datatype:

- (i) When declared outside the main function, after header file, structure variables become global variables.

- (ii) When declared inside the main function, it becomes local variable.

SPL

29.05.24

Structure → small code
recursion → no implementation
pointer

Array }
function } **Lab final**
string } + var

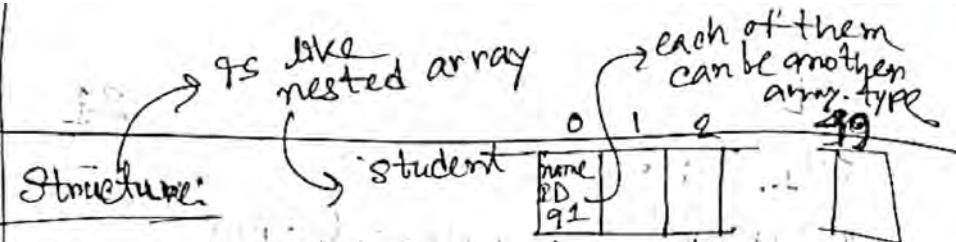
Lab test 10 mark → multiple choice

final topics:

Theory
questions

loop
Array
function
pointer
string
Recursion
Structure

Array } CT; 11 am (3)
function }



- %s needs <string.h> to work

- float %f has 6 value by default

0.000000
2 6

works like
gets (person1.name);

scanf("%s", &person1.name);

- Strong input will take any letter type as input.

Q. Practice code for making student profile using structure.



Question Patterns 5 questions (30mark)

- Definition? Syntax? Benefits?

- Code output? Writing code?

Ques instruction about input?

- Why?

Seatplan, Pencil usable for side notes

Notice board and
in front of room



Admgt card can be recovered from accounts