**A blue and yellow logo

Description automatically generated with low confidence San Francisco Bay University**

**Lab 10 Pointer to Pointer & function Pointer in C Language**

**Due day: 4/11/2023**

**Instruction:**

1. **Push the source code to Github platform.**
2. **Please follow the code style rule like programs on handout.**
3. **Overdue homework submission could not be accepted.**

**4. Takes academic honesty and integrity seriously (Zero Tolerance of Cheating & Plagiarism)**

1. What is running result for each program? And explain by pointer box

*#include<stdio.h>*

*void fun(int \*p)*

*{*

*int q = 10;*

*p = &q;*

*}*

*int main()*

*{*

*int r = 20;*

*int \*p = &r;*

*fun(p);*

*printf("%d", \*p);*

*return 0;*

*}*

*------------------------------------------------------------------*

*#include<stdio.h>*

*void fun(int \*\*pptr)*

*{*

*static int q = 10;*

*\*pptr = &q;*

*}*

*int main()*

*{*

*int r = 20;*

*int \*p = &r;*

*fun(&p);*

*printf("%d", \*p);*

*return 0;*

*}*

*------------------------------------------------------------------*

*#include <stdio.h>*

*int main()*

*{*

*int a[5] = {1,2,3,4,5};*

*int \*ptr = (int\*)(&a+1);*

*printf("%d %d", \*(a+1), \*(ptr-1));*

*return 0;*

*}*

*------------------------------------------------------------------*

*#include <stdio.h>*

*char \*c[] = {"GeksQuiz", "MCQ", "TEST", "QUIZ"};*

*char \*\*cp[] = {c+3, c+2, c+1, c};*

*char \*\*\*cpp = cp;*

*int main()*

*{*

*printf("%s ", \*\*++cpp);*

*printf("%s ", \*--\*++cpp+3);*

*printf("%s ", \*cpp[-2]+3);*

*printf("%s ", cpp[-1][-1]+1);*

*return 0;*

*}*

*------------------------------------------------------------------*

*#include <string.h>*

*#include <stdio.h>*

*#include <stdlib.h>*

*void fun(char\*\* str\_ref)*

*{*

*str\_ref++;*

*}*

*int main()*

*{*

*char \*str = (void \*)malloc(100\*sizeof(char));*

*strcpy(str, "GeeksQuiz");*

*fun(&str);*

*puts(str);*

*free(str);*

*return 0;*

*}*

*------------------------------------------------------------------*

*#include <stdio.h>*

*void f(char\*\*);*

*int main()*

*{*

*char \*argv[] = { "ab", "cd", "ef", "gh", "ij", "kl" };*

*f(argv);*

*return 0;*

*}*

*void f(char \*\*p)*

*{*

*char \*t;*

*t = (p += sizeof(int))[-1];*

*printf("%s\n", t);*

*}*

*------------------------------------------------------------------*

*#include <stdio.h>*

*int main()*

*{*

*int a[][3] = {1, 2, 3, 4, 5, 6};*

*int (\*ptr)[3] = a;*

*printf("%d %d ", (\*ptr)[1], (\*ptr)[2]);*

*++ptr;*

*printf("%d %d\n", (\*ptr)[1], (\*ptr)[2]);*

*return 0;*

*}*

*------------------------------------------------------------------*

*#include <stdio.h>*

*#include <stdlib.h>*

*int main(void)*

*{*

*int i;*

*int \*ptr = (int \*) malloc(5 \* sizeof(int));*

*for (i=0; i<5; i++)*

*\*(ptr + i) = i;*

*printf("%d ", \*ptr++);*

*printf("%d ", (\*ptr)++);*

*printf("%d ", \*ptr);*

*printf("%d ", \*++ptr);*

*printf("%d ", ++\*ptr);*

*}*

*------------------------------------------------------------------*

*#include <stdio.h>*

*int fun(int arr[]) {*

*arr = arr+1;*

*printf("%d ", arr[0]);*

*}*

*int main(void) {*

*int arr[2] = {10, 20};*

*fun(arr);*

*printf("%d", arr[0]);*

*return 0;*

*}*

1. Analyze the following programs with function pointer and explain by pointer box

*#include <stdio.h>*

*void fun(int a)*

*{*

*printf("Value of a is %d\n", a);*

*}*

*int main()*

*{*

*void (\*fun\_ptr)(int) = &fun;*

*(\*fun\_ptr)(10);*

*return 0;*

*}*

*------------------------------------------------------------------*

*#include <stdio.h>*

*void add(int a, int b)*

*{*

*printf("Addition is %d\n", a+b);*

*}*

*void subtract(int a, int b)*

*{*

*printf("Subtraction is %d\n", a-b);*

*}*

*void multiply(int a, int b)*

*{*

*printf("Multiplication is %d\n", a\*b);*

*}*

*int main()*

*{*

*void (\*fun\_ptr\_arr[])(int, int) = {add, subtract, multiply};*

*unsigned int ch, a = 15, b = 10;*

*printf("Enter Choice: 0 for add, 1 for subtract and 2 "*

*"for multiply\n");*

*scanf("%d", &ch);*

*if (ch > 2) return 0;*

*(\*fun\_ptr\_arr[ch])(a, b);*

*return 0;*

*}*

*------------------------------------------------------------------*

*#include <stdio.h>*

*void fun1() { printf("Fun1\n"); }*

*void fun2() { printf("Fun2\n"); }*

*void wrapper(void (\*fun)())*

*{*

*fun();*

*}*

*int main()*

*{*

*wrapper(fun1);*

*wrapper(fun2);*

*return 0;*

*}*

*------------------------------------------------------------------*

*#include <stdio.h>*

*#include <stdlib.h>*

*int compare (const void \* a, const void \* b)*

*{*

*return ( \*(int\*)a - \*(int\*)b );*

*}*

*int main ()*

*{*

*int arr[] = {10, 5, 15, 12, 90, 80};*

*int n = sizeof(arr)/sizeof(arr[0]), i;*

*qsort (arr, n, sizeof(int), compare);*

*for (i=0; i<n; i++)*

*printf ("%d ", arr[i]);*

*return 0;*

*}*

*------------------------------------------------------------------*

*#include <stdio.h>*

*#include <stdbool.h>*

*bool compare (const void \* a, const void \* b)*

*{*

*return ( \*(int\*)a == \*(int\*)b );*

*}*

*int search(void \*arr, int arr\_size, int ele\_size, void \*x,*

*bool compare (const void \* , const void \*))*

*{*

*char \*ptr = (char \*)arr;*

*int i;*

*for (i=0; i<arr\_size; i++)*

*if (compare(ptr + i\*ele\_size, x))*

*return i;*

*// If element not found*

*return -1;*

*}*

*int main()*

*{*

*int arr[] = {2, 5, 7, 90, 70};*

*int n = sizeof(arr)/sizeof(arr[0]);*

*int x = 7;*

*printf ("Returned index is %d ", search(arr, n,*

*sizeof(int), &x, compare));*

*return 0;*

*}*

1. Check the following programs with function return pointer and explain by pointer box

*include <stdio.h>*

*int \*returnPointer(int \*p);*

*int main()*

*{*

*int i=10;*

*int \*ptr1, \*ptr2;*

*ptr1=&i;*

*ptr2=returnPointer(&i);*

*printf("\n \*ptr1 = %d",\*ptr1);*

*printf("\n \*ptr2 = %d",\*ptr2);*

*return 0;*

*}*

*int \*returnPointer(int \*pt)*

*{*

*return pt;*

*}*

*------------------------------------------------------------------*

*include <stdio.h>*

*int \*returnFunc();*

*int main()*

*{*

*int \*ptr=returnFunc();*

*printf("\n \*ptr = %d",\*ptr);*

*printf("\n \*ptr = %d",\*ptr);*

*printf("\n \*ptr = %d",\*ptr);*

*return 0;*

*}*

*int \*returnFunc()*

*{*

*int i=10;*

*return &i;*

*}*

*------------------------------------------------------------------*

*#include <stdio.h>*

*int \*returnFunc();*

*int main()*

*{*

*int \*ptr=returnFunc();*

*printf("\n \*ptr = %d",\*ptr);*

*printf("\n \*ptr = %d",\*ptr);*

*printf("\n \*ptr = %d",\*ptr);*

*return 0;*

*}*

*int \*returnFunc()*

*{*

*static int i=10;*

*return &i;*

*}*