**King Fahd University of Petroleum and Minerals**

**Information and Computer Science Department**

ICS 103: Computer Programming in C

**Spring Semester 2009-2010 (Term-092)**

##### Major Exam-II

**Time:120 minutes Thursday, May 13 2010**

|  |  |
| --- | --- |
| **Name:** |  |
| **ID#:** |  |  |  |  |  |  |  |  |  |  |  |

PLEASE CIRCLE YOUR SECTION BELOW:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Section | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 |
| Instructor | Balah | Darwish | Balah | Darwish | Darwish | Bouche-khma | Balah | Bouche-khma | El-Maleh |
| Time | UT-7-8 | SM-7-8 | UT 9-10 | SM 9-10 | UT 1:10-2 | SM 1:10-2 | UT 8-9 | SM 8-9 | UT 9-10 |

|  |  |  |
| --- | --- | --- |
| Question # | Maximum Marks | Obtained Marks |
| 1: P1,P2,P3 | 8+7+6 |  |
| 1: P4,P5,P6 | 6+8+8 |  |
| 2 | 16 |  |
| 3 | 10 |  |
| 4 | 15 |  |
| 5 | 17 |  |
| Total | 100 |  |

 **Notes.** 1. Make sure you have **EIGHT** pages including the cover page.

 2. Closed book and notes

 3. Write clearly, briefly and precisely

 4. Cheating will result in ZERO grade

##  Good Luck

## Question 1: (42 points)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| #include <stdio.h> // P1: 8 pointsint main() { int i, j=10,k=2; while ( j>=4 ) { i=j-k; do { printf("%d ",i); i=i-2; } while (i>=5); printf("%d\n",i); j=j-3; k++; }  printf("%d\n",j); return 0;} |

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |
|  |  |
|  |

 |
| #include <stdio.h> // P2: 7 points#define SIZE 7int main() { int a[SIZE],i; printf("Enter 7 integers\n"); int count = SIZE-2; for(i = 1;i <= SIZE; i++){ scanf("%d",&a[count]); count = count-2; if(count<0) count=SIZE-1; } for(i=0;i < SIZE; i++) printf("%d\n",a[i]); return 0;}**Values typed by the user:****Enter 7 integers****7 9 2 1 13 15 17** |

|  |
| --- |
|  |
|  |
|  |
|  |
|  |
|  |
|  |

 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| #include <stdio.h> // P3: 6 pointsint check (int x[],int n, int i);#define SIZE 10int main() { int a[SIZE]={8,4,2,15,9,7,12,6,14,21}; printf("%d\n",check(a,SIZE,1)); return 0;}int check (int x[], int n, int i) { if(i>= SIZE) return 1; else if (x[i]>x[i-1]) { printf("%d\n",x[i]); return check(x,n,i+1); } else return 1+check(x,n,i+1);} |

|  |
| --- |
|  |
|  |
|  |
|  |
|  |

 |
| #include <stdio.h> // P4: 6 points #include <stdlib.h>int main (){ int x = 10, y = 8, z; int \*p1, \*p2; p1 = &y;  \*p1=x+4; x=y; p2=&x; \*p2=y+5; p1=p2; z=\*p1+10; printf("%d\n%d\n%d\n", x, y,z); system("pause"); return 0;} |

|  |
| --- |
|  |
|  |
|  |

 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| #include <stdio.h> // P5: 8 pointsvoid f (int \*a,int b); int main() {int i;int a[]={5,12,19,8};int b[]={6,10,16,7};for(i=0;i<4;i++) f(&b[i],a[i]);for(i=0;i<4;i++) printf("%d\t",a[i]);printf("\n");for(i=0;i<4;i++)printf("%d\t",b[i]);return 0;}void f(int \*a,int b) { \*a=\*a-2; b=b+2;} |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  |  |  |  |

 |
| #include <stdio.h> //P6: 8 pointsvoid check(int a[],int b[],int n);int main(void){int x[]={9,7,8,6};int y[4],i;check(y,x,4);for(i=0;i<4;i++)printf("%d\t",y[i]);return 0;}void check(int a[],int b[],int n){int i;for(i=0;i<n;i++) { if(i%3==0) a[i]=b[n-i-1]+1; else if (i%2==0) a[i]= b[i]-2; else  a[i]=3\*i; }} |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

 |

**Question 2: ( 12 points )**

Write a C program that computes the polynomial of degree n



Your program will use an array to store the values of the coefficients 

Your program will prompt the user for the degree n of the polynomial, then it will read the values of the coefficients into an array. Use a size of 50 for the array.

After reading the value of x, your program will display the value of the polynomial.

A sample run of your program to compute for example  for x=0.5 is as follows



**Question 3: ( 15 points )**

Write a function **split** which receives a real value and separates it into 3 parts: a sign (‘+’, ‘-‘, or ‘ ‘ in case of 0), a whole part, and a fractional part. These 3 parts will be returned using output arguments (pointer variables). If the function receives for example -5.67; it will return ‘-‘ for sign,5 for whole part, and 0.67 for fractional part.

In Your main function, read a real value from the user, call the function split, then display the 3 parts returned by the function. The fractional part is displayed with 3 digits after decimal point.

Note: You are not allowed to print anything inside the function split.

A sample run of your program is shown below

**Question 4: ( 15 points )**

Write a program containing the main function and another function **gpa\_sort**.

The function **gpa\_sort** receives a gpa value and returns one of the following values:

1 if gpa ≥ 3.75

2 if 3.5 ≤gpa < 3.75

3 otherwise

In the main function you read from a file **“data.txt”** containing an **unknown number of lines** of data. Each line of data contains id (of type int) and corresponding gpa (of type double).

For each id and gpa read from “data.txt” , your program will :

- write id and gpa in file “firsth.txt” if returned value from **gpa\_sort** is 1,

- write id and gpa in file “secondh.txt” if returned value from **gpa\_sort** is 2.

- Ignore id and gpa if returned value from **gpa\_sort** is 3.

**Question 5: ( 15 points )**

Write a C program that reads 10 integer numbers and store them into an array. The program then prompts the user for an integer number n. After reading n, it will display the numbers from the array that are multiples of n. If the program does not find any multiple of n in the array, it will display “None is found”

The sample runs below show how the program works. In the first run, the typed by the user for n is 4 and in the second run it is 9.

****