**King Fahd University of Petroleum and Minerals**

**Information and Computer Science Department**

ICS 103: Computer Programming in C

**Fall Semester 2010-20011 (Term-103)**

##### Major Exam-I

**Time:100 minutes Wednesday, July 13, 2011**

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

PLEASE CIRCLE YOUR SECTION BELOW:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Section | 01 | 02 | 03 | 04 | 05 |
| Instructor | Dr. Aiman | Dr. Aiman | Mr. Faisal | Mr. Putu | Dr. Azzedin |

|  |  |  |
| --- | --- | --- |
| Question # | Maximum Marks | Obtained Marks |
| 1 | 10x2 =20 |  |
| 2 | 10 |  |
| 3 |  12 |  |
| 4 |  8 |  |
| 5 | 10 |  |
| 6 |  13 |  |
| 7 |  12 |  |
| 8 | 15  |  |
| Total | 100 |  |

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

 2. Closed book and notes

 3. Write clearly, briefly and precisely

 4. Cheating will result in ZERO grade

##  Good LuckQuestion 1: (20 points- 2 points each expression)

1. **Find the values of the following expressions.**

|  |  |
| --- | --- |
| Expression | Value |
| int z=8, a=3, b=9, w=2, y=-5, x; x = z-(a+b/2)+w\*(-y); | **x = 11** |
| If value is -3.14159 then %0.4f displays | **-3.1416** |
| 0 && 2 < 5 | **0** |
| 7%15%4 | **3** |
| (double) 5/2 | **2.5** |
| 5/2\*2+1  | **5** |
| 1 != 7 > 0 | **0** |
| (int)8.6/(double)2 | **4.0** |
| double x=pow(125, 1/3) | **x = 1.0** |
| **int a=6, b=9, c=14, flag=1;**int x = a < 5 && flag || c > a + b | **x = 0** |

##

**Question 2 (10 points)**

Fill the column of **printed output** for the corresponding input. The program is run 5 times and each time the input is shown in the first column.

#include <stdio.h>

|  |  |
| --- | --- |
| **INPUT** | **PRINTED OUTPUT** |
|  **17 6** | **C** |
|  **12 12** | **B** |
|  **19 4** | **A** |
|  **20 5** | **E** |
|  **15 5** | **D** |

int main () {

int x,y;

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

if(10<x && x<20)

 if(y>=10 || y<5)

 if (x>= 16)

 printf("A");

 else

 printf("B");

 else

 if(y >= 6)

 printf("C");

 else

 printf("D");

else

 printf ("E");

return 0;

}**Question 3 (12 points)**

Write the equivalent c condition so that each of the following statements is satisfied.

|  |  |
| --- | --- |
| Statement | Equivalent c condition |
| x is not smaller than 10 and is smaller than or equal to 20  | **x >= 10 && x <= 20** |
| x is an uppercase alphabetic character | **x >=’A’ && x<=’Z’** |
| x is outside the interval [-10,10] | **x < -10 || x > 10** |
| x and y are even numbers | **x%2==0 && y%2==0** |

**Question 4 (8 points)**

Consider the following program. What will be the output for the different values of x typed by the user.

#include <stdio.h>

int main() {

int x;

|  |  |
| --- | --- |
| Value of x typedby the user | Program output |
| **1** | **6** |
| **4** | **7** |
| **5** | **5** |
| **10** | **-1** |

printf("Enter a value for x >");

scanf("%d", &x);

switch(x) {

 case 1:

 case 2: x=2\*x+1;

 case 4: x=x+3;

 case 5: break;

 case 6: x=x-3;

 break;

 default: x=-1;

 }

 printf("%d\n",x);

 return 0;

}

**Question 5: (10 points: 6+4)**

**i)** Assume that the variables **x1**, **x2**, **m**, and **d** are of type double, write the two formulas for **m** and **d** in C. The actual formulas are given here:

|  |
| --- |
| 1. *m* = ( )
2. *d =*
 |

|  |
| --- |
| **(a) m = 4.0/5.0\*(x1 + x2)/(x1 – x2);** |
| **(b) d = sqrt(x1\*x1 + pow(x2,6)); OR**  **d = sqrt(pow(x1, 2) + pow(x2, 6));** |

ii) Determine what will be printed by the following program.

#include <stdio.h>

int main(void) {

double m = 3.564, d = -5.746;

**printf(“m=%5.1f\n”, m);**

**printf(“d=%7.2f\n”, d);**

return 0;

}

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **m** | **=** |  |  | **3** | **.** | **6** |  |  |  |  |  |  |  |  |  |
| **d** | **=** |  |  | **-** | **5** | **.** | **7** | **5** |  |  |  |  |  |  |  |

**Question 6: (13 points)**

Write a C program which will read a month and determine the number of days in that month. The program should print one of the following messages accordingly.

**You MUST use switch statement.**

|  |  |
| --- | --- |
| Month typed by the user | Message displayed |
| 4, 6, 9, 11 | *There are 30 days.* |
| 1, 3, 5, 7, 8, 10, 12 | *There are 31 days.* |
| 2 | *There are 28 days.* |
| Any other number | *Invalid month.* |

**Here are sample runs:**

**run 1: month typed is 1 run 2: month typed is 13.**

** **

**#include <stdio.h>**

**int main(void) {**

 **int month;**

 **printf("Enter a month > ");**

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

 **switch (month) {**

 **case 1: case 3: case 5: case 7: case 8:**

 **case 10: case 12:**

 **printf(“There are 31 days.\n”);**

 **break;**

 **case 4: case 6: case 9: case 11:**

 **printf(“There are 30 days.\n”);**

 **break;**

 **case 2:**

 **printf(“There are 28 days.\n”);**

 **break;**

 **default: printf("Invalid month.\n");**

 **}**

 **return 0;**

**}**

**Question 7: (12 points)**

**Rewrite the following c statements using switch instead of if-else-if. Assume that i and x have been declared as integers.**

if(i==1||i==-5)

 x=x+2;

else if(i==8)

 x=x+3;

else if (i==10||i==11||i==12)

 x=x+5;

else

 x=x+7;

**switch (i) {**

**case 1 :**

**case -5: x=x+2;**

 **break;**

**case 8: x=x+3;**

 **break;**

**case 10:**

**case 11:**

**case 12: x=x+5;**

 **break;**

**default: x=x+7;**

**}**

**Question 8: (15 points)**

Write a program that asks the user for a code character and a radius. The code character can be:

A or a to compute and display the area of the circle

C or c to compute and display the circumference of the circle

D or d to compute and display the diameter of the circle



**Use if-else-if statement**

 **Sample Run**





**#include <stdio.h>**

**#define PI 3.14159**

**int main() {**

**double radius;**

**double diameter,area,circum;**

**char choice;**

**printf("Enter code and radius >");**

**scanf("%c%lf",&choice,&radius);**

**if(choice == 'A' || choice == 'a') {**

 **area=PI\*radius\*radius;**

 **printf("area=%f",area); }**

**else if(choice == 'C' || choice == 'c') {**

 **circum=2\*PI\*radius;**

 **printf("circumference=%f",circum); }**

**else if (choice=='D' || choice == 'd') {**

 **diameter=2\*radius;**

 **printf("diameter=%f",diameter); }**

**else**

 **printf("Sorry you entered wrong code");**

**return 0;**

**}**