



Dep.: Computer Science
Sections: 1, 2, 3
Year: 1433-1434
Date: 05/01/1434

Course: Computer Programming (CS107)
Dr. Miled Tezeghdanti
First Semester
Allowed time: 1h30

Midterm Exam Solution (7 pages, 4 Exercises)
(Marks: 20 Points)

	الاسم
	الرقم الجامعي
	الشعبة
	التوقيع

- Open documents.
- Write in the spaces provided.
- Be neat.

	Mark	Out of
Exercise 1		6
Exercise 2		4
Exercise 3		6
Exercise 4		4
Total		20

Exercise 1 (6 points)

What is the output of the following codes?

1) (2 points)

```
#include <iostream>
using namespace std;

int main() {
    int x = 3;
    int y = 2;
    int z = 8;
    int t;
    t = x + y + 2 * z / 3;
    cout << "t = " << t << endl;
    return 0;
}
t = 10
```

2) (2 points)

```
#include <iostream>
using namespace std;

int main() {
    int x = 12;
    int y = 8;
    int i;
    if (x > y) {
        i = y;
    }
    else {
        i = x;
    }
    cout << "before while i = " << i << endl;
    while (i >= 1) {
        cout << "inside while i = " << i << endl;
        if (x % i == 0 && y % i == 0) {
            break;
        }
        i--;
    }
    cout << "after while i = " << i << endl;
    return 0;
}
before while i = 8
inside while i = 8
inside while i = 7
inside while i = 6
inside while i = 5
inside while i = 4
after while i = 4
```

3) (2 points)

```
#include <iostream>
using namespace std;
```

```
int main() {
    int g = 86;

    switch (g/10) {
        case 10:
        case 9:
            cout << "A";
            break;
        case 8:
            cout << "B";
            break;
        case 7:
            cout << "C";
            break;
        case 6:
            cout << "D";
            break;
        default:
            cout << "F";
    }
    if (g >= 60 && (g % 10 >= 5 || g == 100 )) {
        cout << "+";
    }
    cout << endl;
    return 0;
}
```

B+

Exercise 2 (4 points)

Write a C++ program that asks the user to enter a number **n** and determines the **Units** of the number **n** if **n** is even and the **Tens** of the number **n** if **n** is odd.

Example 1:

n = 146
Units of 146 is 6

Example 2:

n = 347
Tens of 347 is 4

Example 3:

n = 5
Tens of 5 is 0

// Exercise 2

```
#include <iostream>
using namespace std;
```

```
int main() {
    int n;

    cout << "n = ";
    cin >> n;
    if (n % 2 == 0) {
        cout << "Units of " << n << " is " << n % 10 << endl;
    }
    else {
        cout << "Tens of " << n << " is " << n / 10 % 10 << endl;
    }
    return 0;
}
```

Exercise 3 (6 points)

Write a C++ program that determines the set of divisors of a given number **n**.

Example 1:

n = 12

Set of Divisors of 12 = {1, 2, 3, 4, 6, 12}

Example 2:

n = 16

Set of Divisors of 16 = {1, 2, 4, 8, 16}

Example 3:

n = 29

Set of Divisors of 29 = {1, 29}

Example 4:

n = 34

Set of Divisors of 34 = {1, 2, 17, 34}

// Exercise 3

```
#include <iostream>
```

```
using namespace std;
```

```
int main() {
```

```
    int n;
```

```
    cout << "n = ";
```

```
    cin >> n;
```

```
    cout << "Set of divisors of " << n << " = {";
```

```
    for (int i = 1; i < n; i++) {
```

```
        if (n % i == 0) {
```

```
            cout << i << ", ";
```

```
        }
```

```
    }
```

```
    cout << n << "}\n";
```

```
    return 0;
```

```
}
```

Exercise 4 (4 points)

Write a C++ program that computes the sum of all the digits of the numbers smaller or equal to a given number **n**.

Example 1:

```
n = 13;
```

```
sum = 55
```

```
//(1)+(2)+(3)+(4)+(5)+(6)+(7)+(8)+(9)+(1+0)+(1+1)+(1+2)+(1+3)= 55
```

Example 2:

```
n = 14;
```

```
sum = 66
```

```
//(1)+(2)+(3)+(4)+(5)+(6)+(7)+(8)+(9)+(1+0)+(1+1)+(1+2)+(1+3)+(1+4) = 60
```

Example 3:

```
n = 436;
```

```
sum =
```

```
//(1)+(2)+(3)+...+(4+3+2)+(4+3+3)+(4+3+4)+(4+3+5)+(4+3+6) = 4555
```

```

// Exercise 4
#include <iostream>
using namespace std;

int main() {
    int n;

    int sum = 0;

    cout << "n = ";
    cin >> n;

    for (int i = 1; i <= n; i++) {
        int j = i;
        if (j > 1) {
            cout << "+";
        }
        cout << "(";
        while (j > 0) {
            cout << j % 10;
            sum += j % 10;
            j /= 10;
            if (j > 0) {
                cout << "+";
            }
        }
        cout << ")";
    }

    cout << " = " << sum << endl;
    cout << "sum = " << sum << endl;
    return 0;
}

```