

### Problem Set 3

1. Find out all the values of ii and c that you can enter such that printf's ONE..SIX get executed (in multiple runs of the program).

```
#include <stdio.h>
int main() {
    int ii = 99;
    char c = 100;

    printf("Enter values for ii and c: ");
    scanf("%d %c", &ii, &c);
    printf("ii=%d, c=%c, c=%d\n", ii, c, c);

    if (ii < c)
        ++ii;
    else
        c++;

    printf("ii=%d c=%d\n", ii, c);

    if (c == ii) printf("ONE: ii=c=%d\n", ii);           // ONE

    if (c != ii);
    printf("TWO: ii=%d c=%d\n", ii, c);                // TWO

    if (c >= ii) {
        if (c > ii) {
            printf("THREE: c(%d) > ii(%d)\n", c, ii); // THREE
        } else {
            printf("FOUR: c(%d) == ii(%d)\n", c, ii); // FOUR
        }
    } else {
        if (c == ii - 1) {
            printf("FIVE: c(%d) - ii(%d) == 1\n", c, ii); // FIVE
            printf("c(%d) == ii(%d) - 1\n", c, ii);
        } else {
            printf("SIX: c(%d) < ii(%d)\n", c, ii);    // SIX
        }
    }
}
```

2. Convert the following program which uses if-else into an equivalent program which uses a switch statement.

```
#include <stdio.h>

int main() {
    char c;
    scanf("%c", &c);
```

```

    if (c == 'J') printf("I am in Jamuna.\n");
    else if (c == 'K') printf("I am in Kaveri.\n");
    else if (c == 'N') printf("I am in Narmada.\n");
    else if (c == 'B') printf("I am in Brahmaputra.\n");
    else if (c == 'D') printf("I am a day-scholar.\n");
    else printf("I am somewhere, but I don't know where.\n");
}

```

3. Convert the above program to work with upper-case as well-as lower-case input letters. Thus, k and K should print the statement for Kaveri. Try using if-else as well as using switch.

4. Convert the following program from switch to if-else.

```

#include <stdio.h>

int main() {
    int num;

    scanf("%d", &num);

    switch (num) {
        case 2: printf("num is even.\n");
        case 7: printf("num is prime.\n"); break;
        case 3: printf("num is odd.\n");
        case 5: printf("num is prime.\n");
        case 1: printf("num is odd.\n"); break;
        default:
            (num % 2) ? printf("num is odd.\n") : printf("num is even.\n");
    }
}

```

5. Consider the following program that finds if a number is odd or even using if-else statements. Rewrite the program without using if-else / switch which still maintains the functionality.

```

#include <stdio.h>

int main() {
    int n;

    scanf("%d", &n);

    if (n % 2 == 1) printf("%d is odd.\n", n);
    else printf("%d is even.\n", n);
}

```

6. Write a data-mining program to implement the following table, which tries to predict if a customer would buy a product. In particular, you need to ask for inputs Age, Gender and City, and print one of the three outputs Yes, No or Cannot Say.

Age	Gender	City	Will buy?
25—30	M	Chennai	Yes
33—45	F	Bangalore	Yes
57—80	F	Chennai	No
25—30	F	Hyderabad	No
13—19	M	Bangalore	Yes
16—20	M	Chennai	No

7. What is the output of the following program?

```
#include <stdio.h>

int x = 0;

int main() {
    int x = 1;
    int y = 2;

    {
        int y = 3;
        if (x < y) printf("ONE: x(%d) < y(%d)\n", x, y);
        else {
            int x = 4, y = 5;
            printf("TWO: x=%d, y=%d\n", x, y);
        }
    }

    switch (y) {
    case 0: {
        int y = 6;
        printf("THREE: x=%d, y=%d\n", x, y);
        break;
    }
    case 2: {
        int x = 7;
        printf("FOUR: x=%d y=%d\n", x, y);

        if (x > y) {
            int x = 8;
            int y = 9;
            if (x > y) printf("FIVE: x(%d) > y(%d)\n", x, y); else printf("SIX: x(%d) <=
y(%d)\n", x, y);
        } else {
            int y = 10;
            printf("SEVEN: x(%d) %s y(%d)\n", x, x>y ? ">" : "<=", y);
        }
        break;
    }
}
```

```
case 1: printf("EIGHT: x(%d) %s y(%d)\n", x, x>y ? ">" : "<=", y); break;
default: {
    {
        int x = 11, y = 12;
    }
    printf("NINE: x=%d, y=%d\n", x, y);
}
}
printf("TEN: x=%d, y=%d\n", x, y);
}
```