Indian Institute of Technology Kanpur
ESC101 Fundamentals of Computing, 2018-19-a

MINOR QUIZ

Name: **ANSWER KEY**

Roll:

W14P*

Sect:

P1

$$f(x) = 3x^2 - 2x + 5$$

$$g(x) = 4x^2 + 5x$$

$$h(x) = x^3$$

(A) $f(x) = \mathcal{O}\left(g(x)\right)$

(B) $g(x) = \mathcal{O}\left(f(x)\right)$

(C) $f(x) = \mathcal{O}\left(h(x)\right)$

(D) $h(x) = \mathcal{O}\left(f(x)\right)$

```
1   #include <stdio.h>¬
2 ▾ void swap(int *p, int *q){¬
3 ▾     if(*p < *q){¬
4           int a = *p;¬
5           *p = *q;¬
6           *q = a;¬
7       }¬
8   }¬
9 ▾ int main(){¬
10      static int a = 25, b = 15;¬
11      swap(&a, &b);¬
12      a -= b;¬
13 ▾    if(a == 0){¬
14          printf("%d", b); // No spaces at all¬
15          return 0;¬
16      }else¬
17          main();¬
18  }¬
```

Q1: Which of the following four statements is true? Multiple statements may be true

Q2: What is the output of this code?
Note: whitespaces indicated using gray-colored characters as in Prutor

GOLD SOLUTION	GOLD SOLUTION
A, B, C	5

MAX MARKS	MAX MARKS
5	**5**

$$f(x) = x^2 + x + 1$$

$$g(x) = 100x + 100$$

$$h(x) = f(x) \cdot g(x)$$

(A) $f(x) = \mathcal{O}\left(g(x)\right)$

(B) $g(x) = \mathcal{O}\left(f(x)\right)$

(C) $f(x) = \mathcal{O}\left(h(x)\right)$

(D) $g(x) = \mathcal{O}\left(h(x)\right)$

```c
1   #include <stdio.h>
2   int func(int n){
3       if(n==0 || n==1)
4           return 1;
5       if(n==2)
6           return 2;
7       return func(n-1)+func(n-2)+func(n-3);
8   }
9   int main(){
10      printf("%d", func(5));
11      return 0;
12  }
```

Q1: Which of the following four statements is true? Multiple statements may be true

Q2: What is the output of this code?
Note: whitespaces indicated using gray-colored characters as in Prutor

GOLD SOLUTION	GOLD SOLUTION
B, C, D	13
MAX MARKS	**MAX MARKS**
5	**5**

$$f(x) = 20x + 30$$

$$g(x) = 4x + 5$$

$$p(x) = f(x) + g(x)$$

$$q(x) = f(x) \cdot g(x)$$

(A) $p(x) = \mathcal{O}(x)$

(B) $p(x) = \mathcal{O}(x^2)$

(C) $q(x) = \mathcal{O}(x)$

(D) $q(x) = \mathcal{O}(x^2)$

Q1: Which of the following four statements is true? Multiple statements may be true

```c
#include <stdio.h>
int main(){
    static int a[13] = {1,2,3,4,5,4,3,2,1,2,3,4,5};
    static int pos = 0;
    if(pos >= 13){
        printf("%d", pos);
        return 0;
    }
    pos = pos + a[pos];
    main();
}
```

Q2: What is the output of this code?
Note: whitespaces indicated using gray-colored characters as in Prutor

GOLD SOLUTION	GOLD SOLUTION
A, B, D	15

MAX MARKS	MAX MARKS
5	**5**

$$f(x) = x^2 - 25$$

$$g(x) = 2x^2 - 100$$

(A) $f(x) = \mathcal{O}\left(f(x)\right)$

(B) $f(x) = \mathcal{O}\left(g(x)\right)$

(C) $g(x) = \mathcal{O}\left(f(x)\right)$

(D) $g(x) = \mathcal{O}\left(g(x)\right)$

```c
1   #include <stdio.h>
2   int main(){
3       static int a = -1;
4       if(a < 0){
5           a += a;
6           if(a < -32)
7               a = -a;
8           main();
9       }else{
10          printf("%d", a); // No spaces
11          return 0;
12      }
13  }
```

Q1: Which of the following four statements is true? Multiple statements may be true

Q2: What is the output of this code?
Note: whitespaces indicated using gray-colored characters as in Prutor

GOLD SOLUTION	GOLD SOLUTION
A, B, C, D	64

MAX MARKS	MAX MARKS
5	**5**