Problem Solving Through Programming in C

Tutorial Session 7

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Functions

How many times 'Hi' will be printed in the program given below

```
#include<stdio.h>
int i;
int fun();

int main()
{
   while(i)
   {
      fun();
      main();
   }
   printf("Hello\n");
   return 0;
}
int fun()
{
   printf("Hi");
}
```

a) Once
b) Zero times
c) Infinite times
d) Compilation error

```
#include <stdio.h>
int i = 15;
int fun();
int main(){
    int j = i;
    i = fun();
    printf("%d, %d", i, j);
    return 0;
}
int fun(){
    int i = 25;
    return i;  }
```

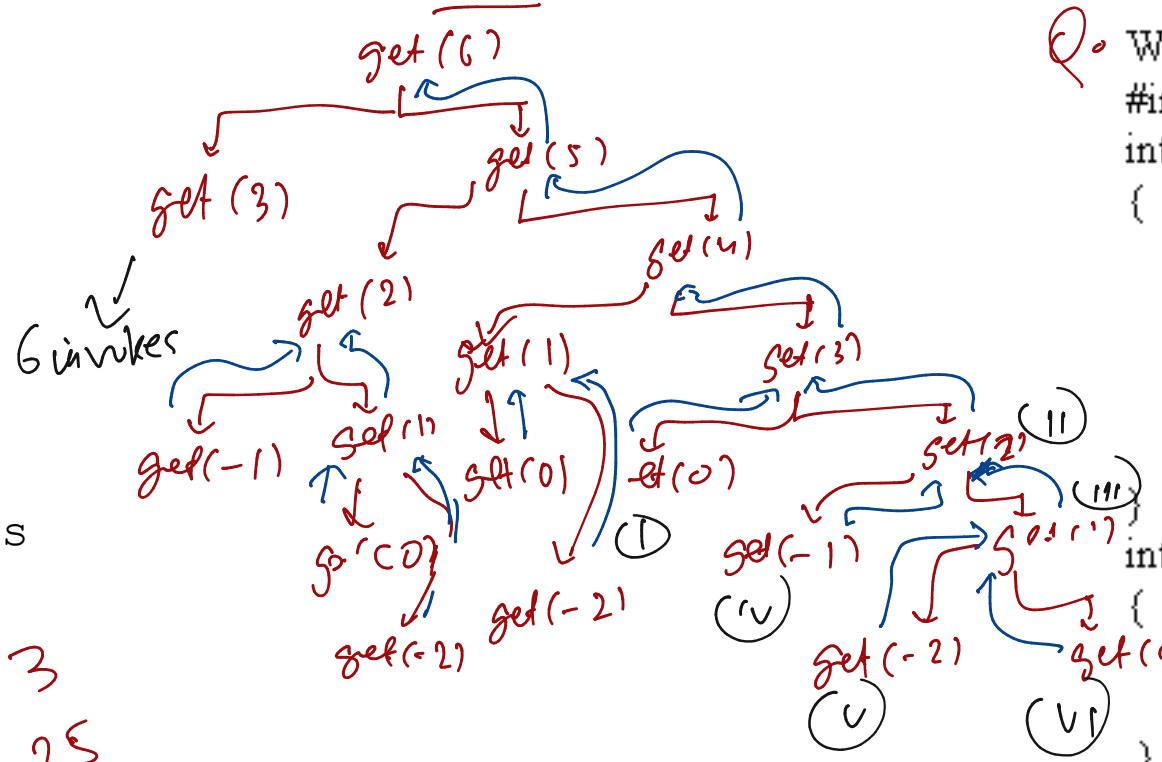
a) 15, 15
b) 25, 15
c) 25, 25
d) 15, 25

Functions

Q. How many times the function get() will be invoked if get(6) is called from the main function.

```
void get(int n)
{
if (n<1) return;
get (n-1);
get (n-3);
}
```

a) 6 times
b) 12 times
c) 25 times
d) Infinite times



Q. What is the output of the following C program?

```
#include <stdio.h>
int fun(int n)
{
   int i, j, sum = 0;
   for(i = 1;i<=n;i++)
      for(j=i;j<=i;j++)
         sum=sum+j;
   return(sum);
}

int main()
{
   printf("%d", fun(5));
   return 0;
}
```

a) 25
b) 5
c) 15
d) 10

Functions

Q. What will be the output?

```
#include<stdio.h>
int f(int n, int k)
{
   if (n == 0)
      return 0;
   else if (n % 2)
      return f(n/2, 2*k) + k;
   else return f(n/2, 2*k) - k;
}
int main ()
{
   printf("%d", f(20, 1));
   return 0;
}
```

a) 5
b) 8
c) 9
d) 20

f(20,1)
20%2 = 0
f(10,2) - 1 ← 10 - 1 = 9
10%2 = 0
f(5,4) - 2 ← 12 - 2 = 10
5%2 = 1
f(2,8) + 4 ← 8 + 4 = 12
2%2 = 0
f(1,16) - 8 ← 16 - 8 = 8
1%2 = 1
f(0,32) + 16 = 16
0

435 >> 1
= (0 1 0 1 1 0 0 1)$_2$
= (217)$_{10}$

2	435	✓
2	217	1 ✓
2	108	1 ✓
2	54	0 ✓
2	27	0 ✓
2	13	1 ✓
2	6	1 ✓
2	3	0 ✓
2	1	1 ✓
	0	1.

(435)$_{10}$ = (1 1 0 1 1 0 0 1 1)$_2$

1 1 0 1 1 0 0 1 1

Q. Consider the function

```
int func(int num)
{
 int count = 0;
 while(num)
 {
    count++;
    num >>= 1;
 }
return (count) ;
}
```

a) 9
b) 8
c) 0
d) 10

If ">>" this operation right shift num (binary representation of num) by one digit. E.g. if num=60 then num>>1 is 30.
Then func(435) the value returned is

count = 1 (1 1 0 1 1 0 0 1 1)$_2$
2 (0 1 1 0 1 1 0 0 1)$_2$
3 (0 0 1 1 0 1 1 0 0)$_2$

Functions

Q. What will be the output?

```
#include<stdio.h>
int main()
{
    {
    int a = 70;
     }
     {
    printf("%d", a);
    }
  return 0;
}
```

Scope of variable a is not defined.

a) 70
b) Garbage value
c) Compilation error
d) None

Q. What is the output of the C code given below?

```
#include <stdio.h>
float func(float age[]);

int main()
{
   float result, age[] = { 23.4, 55, 22.6, 3, 40.5, 18 };
   result = func(age);
   printf("Result is=%0.2f", result);
}

float func(float age[])
{
   int i;
   float result, sum = 0.0;
   for (i = 0; i < 6; ++i) {
      sum += age[i];
   }
   result = (sum / 6);
   return result;
}
```

i=0 sum = 0 + 23.4 = 23.4
i=1 sum = 23.4 + 55 = 78.4
i=2 .
i=3 .
i=4 .
i=5 . sum.

a) Result is=27.08
b) Result is=27.083334
c) Compiler error as result is declared twice
d) Error: invalid prototype declaration

result = sum/6 = 27.083337

Functions

Q. What will be the output of the C code?

```
#include <stdio.h>
int main()
{
        char x=0;
        for(x=0; x<=127; x++)
        {
                printf("%d ", x);
        }
        return 0;
}
```

a) Compilation error
b) 0, 1, 2 …, 127
c) 0, 1, 2,…, 127, -128, -127,…infinite loop
d) 1, 2, 3,…,127

Q. Consider the function

```
find(int x, int y)
{
        return((x<y) ? 0 : (x-y));
}
```

Let a and b be two non-negative integers. The call find(a, find(a, b)) can be used to find the

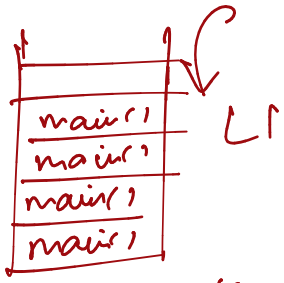
a) Maximum of a, b
b) Positive difference between a and b
c) Sum of a and b
d) Minimum of a and b

Functions

Q. How many times Hello world will be printed?

```
#include<stdio.h>
int main()
{
   printf("Hello world\n");
   main();
   return 0;
}
```

a) Infinite times
b) 32767
c) 65535
d) Till stack overflow



Q. What will be the output?

```
#include<stdio.h>
void func(int n, int sum)
{
int k = 0, j = 0;
if (n == 0) return;
        k = n % 10;
j = n / 10;
sum = sum + k;
func (j, sum);
printf ("%d, ", k);
}

int main ()
{
int a = 2048, sum = 0;
func (a, sum);
printf ("%d ", sum);
return 0;
}
```

a) 8, 4, 0, 2, 14
b) 8, 4, 0, 2, 0
c) 2, 0, 4, 8, 14
d) 2, 0, 4, 8, 0

Functions

Write a C program to enter an integer and convert to octal using recursion.