C Program to Generate All the Set Partitions of n Numbers Beginning from 1 and so on

```
#include <stdio.h>
#include <stdlib.h>
typedef struct {
int first;
    int n;
    int level;
} Call;
void print(int n, int * a) {
    int i ;
    for (i = 0; i<= n; i++) {
printf("%d", a[i]);
    }
printf("\n");
}
 void integerPartition(int n, int * a){
    int first;
    int i;
    int top = 0;
    int level = 0;
    Call * stack = (Call * ) malloc (sizeof(Call) * 1000);
    stack[0].first = -1;
    stack[0].n = n;
    stack[0].level = level;
    while (top >= 0){
        first = stack[top].first;
        n = stack[top].n;
        level = stack[top].level;
        if (n >= 1) {
            if (first == - 1) {
                a[level] = n;
                print(level, a);
                first = (level == 0) ? 1 : a[level-1];
i = first;
            } else {
i = first;
i++;
            }
            if (i<= n / 2) {
                a[level] = i;
                stack[top].first = i;
                top++;
                stack[top].first = -1;
                stack[top].n = n - i;
                stack[top].level = level + 1;
        } else {
            top--;
        }
    } else {
    top --;
    }
}
}

int main(){
   int N = 1;
   int * a = (int * ) malloc(sizeof(int) * N);
```

```
   int i;
printf("\nEnter a number N to generate all set partition from 1 to N: ");
scanf("%d", &N);
   for ( i = 1; i<= N; i++)
   {
printf("\nInteger partition for %d is: \n", i);
integerPartition (i, a);
   }
   return(0);
}
```

OUTPUT: