**Subject: PRF192- PFC**

**Workshop 04**

**Objectives:**

1. Managing data using pointers
2. Developing programs using simple menus

**Part 1: Use notebook**

**Exercise 1** (1 mark) : Explain outputs:



n=7, m=6

\*pn=&n

\*pm=m

n=m+2\*m-3\*n=6+2\*6-3\*7=-3

m=m-n=6--3=9

Output:m+n=9-3=6



c1=’A’(65)

c2=’F’(70)

\*p1=&c1

\*p2=&c2

c1=c1+3=68

c2=c2-5=65

Output:c1-c2=68-65=3



x=3.2

y=5.1

\*p1=&x

\*p2=&y

x=x+3-2\*y=3.2+3-2\*5.1=-4

y=y-3\*x=5.1-3\*(-4)=-1.9

Output:x+y=-5.9

**Exercise 2: (1 marks) What are outputs**

n=7

m=8

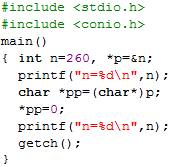
\*p1=&n

\*p2=&m

n=n+12-m+m=7+12=19

m=m+n-2\*n=11

Output: m+n=30



n=260

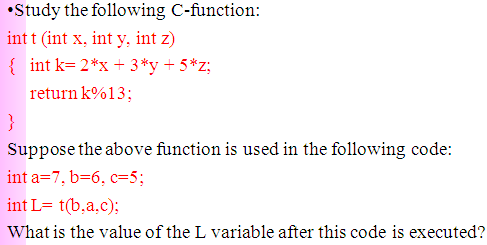
\*p=&n

Output: n=260

\*pp=p

Output: n=256

**Exercise 3: (2 marks) Walkthroughs**

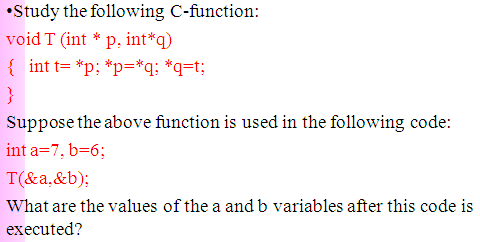


a=7 b=6 c=5

t(x,y,z) t(b,a,c)

k=2\*x+3\*y+5\*z=2\*6+3\*7+5\*5=58

Output: return k%13=58%13=6



a=7, b=6

T(&a,&b)

T(\*p,\*q)

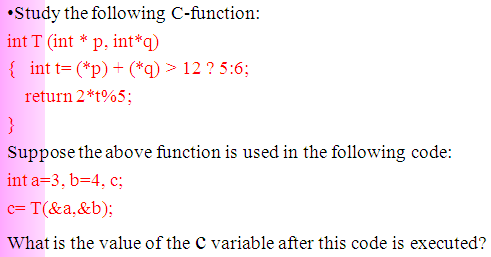
t=\*p=a=7

\*p=\*q=6

\*q=7

Output:

a=7 b=6



a=3

b=4

c=T(&a,&b)=T(\*p,\*q)

T=\*p+\*q>12?5:6=a+b>12?5:6=7>12?5:6=6

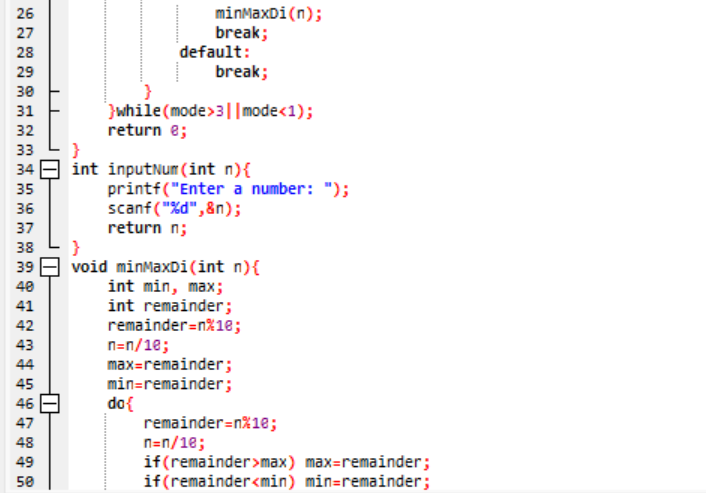
Output: return 2\*t%5=2\*6%5=2

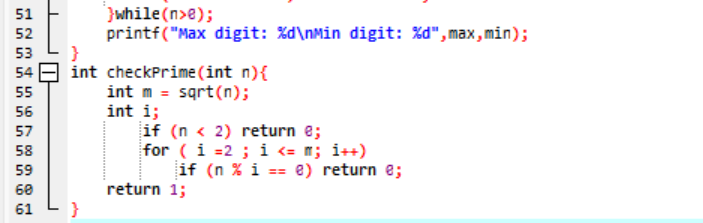
**Part 2: Develop a program using simple menu**

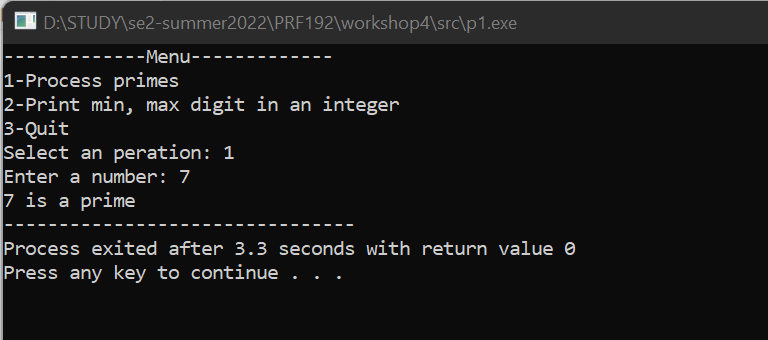
**Program 1(3 marks):**

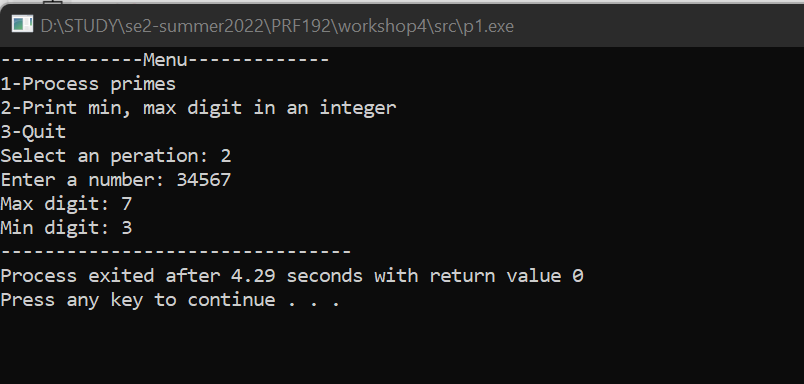
|  |  |
| --- | --- |
| **Objectives** | Practice implementing a program with simple menu. |
| **Related knowledge** | None |
| **Problem** | Write a C program that will execute repetitively using a simple menu as following:   1. **Process primes** 2. **Print min, max digit in an integer;** 3. **Quit**   **Select an operation:**   1. When user selects the option 1, the program will accept a positive integral number and print out a message about whether the input number is a prime or not. 2. When user selects the option 2, the program will accept a positive integral number and print out the minimum and maximum digit in this number. 3. The program will terminate when user selects the option 3. |
| **Analysis** | **Nouns:**  - positive integral number 🡪 **int n**  - A number represents a choice of user 🡪 **int choice;**  **Functions**:  **int prime( int n) 🡪 see above**  **void printMinMaxDigits( int n) 🡪 see above** |
| **Suggested algorithm (logical order of verbs)** | Begin  Do /\* Print out the menu and get user choice\*/  { Print out “1- Process primes\n”;  Print out “2- Print min, max digit in an integer \n”;  Print out “3- Quit\n”;  Print out “Select an operation:”;  switch(choice)  { case 1: do  { Input n;  }  while(n<0);  If ( prime(n)==1) Print “ It is a prime\n”;  Else Print “ It is not a prime\n”;  break;  case 2: do  { Input n;  }  while(n<0);  printMinMaxDigits( int n) ;  break;  }  }  while ( choice >0 & choice<3);  End |

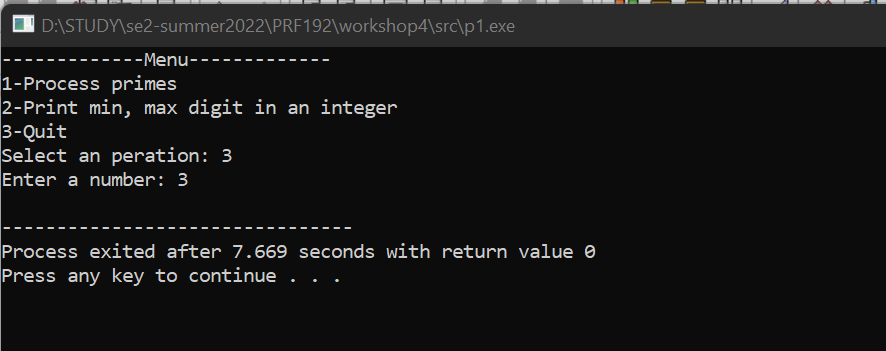












**Program 2(3 marks): ( refer to the workshop 2 for algorithms)**

Write a C program that will execute repetitively using a simple menu as following:

**1-Fibonacci sequence**

**2-Check a date**

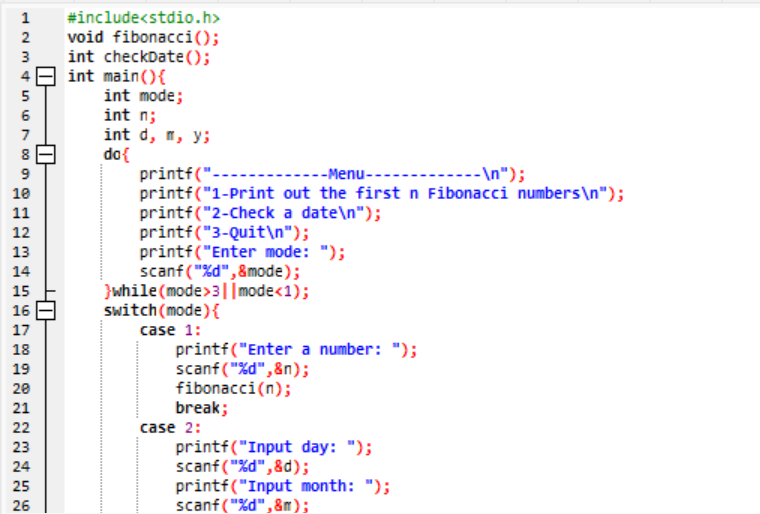
**3-Quit**

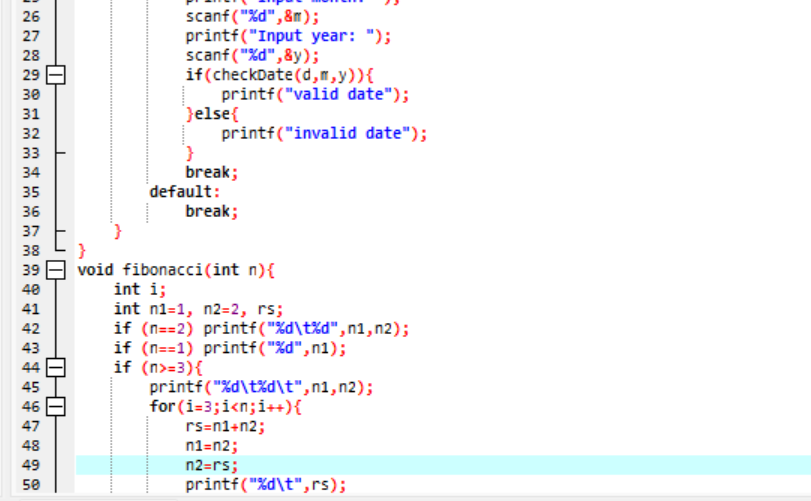
**Choose an operation:**

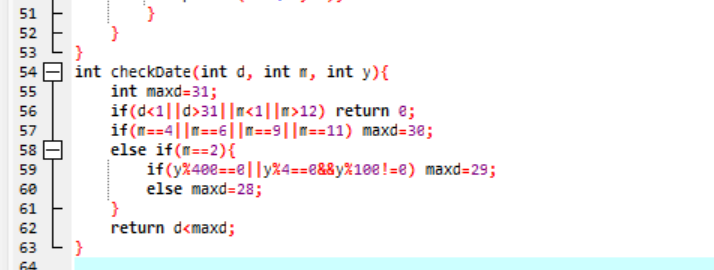
1- When the option 1 is selected, the program will accept a positive integral number, called as n, then the first n Fibonacci numbers will be printed out

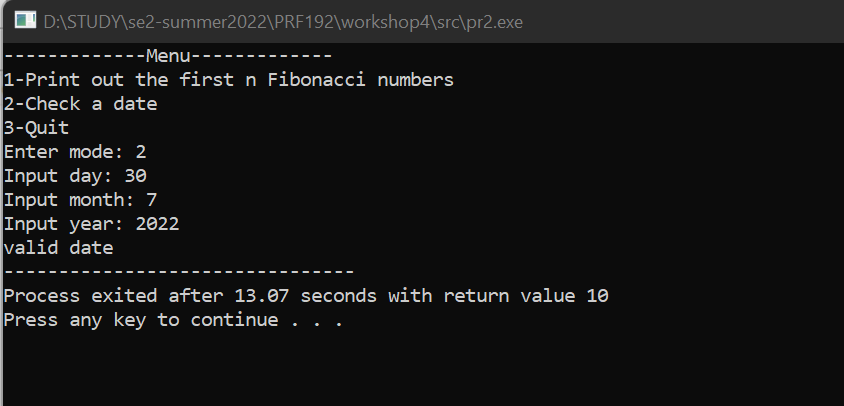
2- When the option 2 is selected, the program will accept a date then the program will tell that whether this data is valid or not.

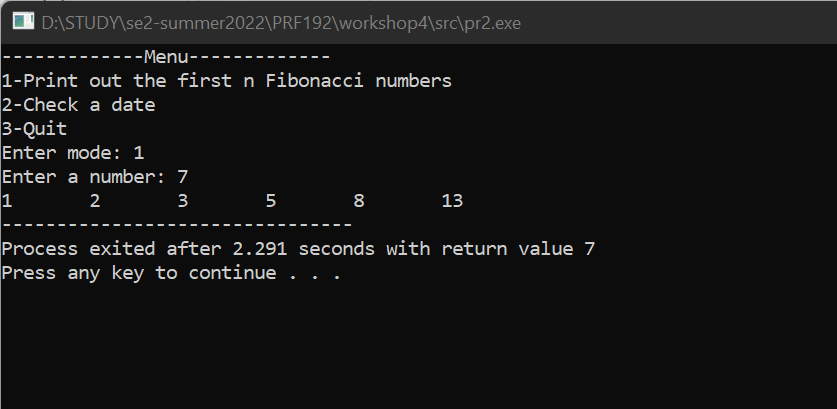
3- If the option 3 is selected, the program quits

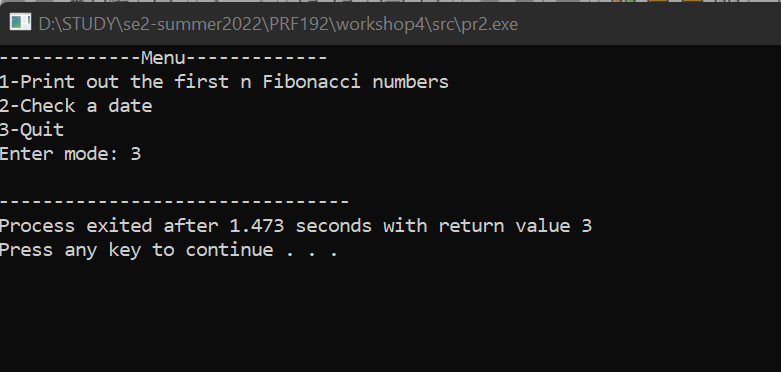












**More Programs**

You can pick 2 or 3 functions in the workshop 2, associate them to a new program.