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Part - B

Q.1]
```
fact = 1;
db = 0;
for (i = 1; i<=10; i++)
    if (fact == 120)
            break;
    fact = fact * i;
    db = db + fact;
}
```

a] Three Address Code

①	fact = 1	——> leader
②	db = 0	
③	i = 1	
④	if (i > 10) goto 13	——> leader
⑤	if (fact == 120) goto 13	——> leader
⑥	t_1 = fact * i	——> leader
⑦	fact = t_1	
⑧	t_2 = db + fact	
⑨	db = t_2	
⑩	t_3 = i + 1	
⑪	i = t_3	
⑫	goto 4	
⑬	exit	

b] Leaders :
① fact = 1
④ if (i > 10) goto 13
⑤ if (fact == 120) goto 13
⑥ t_1 = fact * i

Control flow graph:

```
                    ┌──────────────┐
                    │  fact = 1    │
                    │  db = 0      │
                    │  i = 1       │
                    └──────┬───────┘
                           │
                           ▼
        ┌──────────────────────────┐   True
        │   if ( i > 10 )          ├──────────────┐
        └──────────┬───────────────┘              │
                   │ False                         │
        ┌──────────▼───────────────┐   True        │
        │  if ( fact == 120 )      ├────────┐      │
        └──────────┬───────────────┘        │      │
                   │ False                   ▼      ▼
        ┌──────────▼───────────────┐      ┌──────────┐
        │  t₁ = fact * i           │      │  Exit    │
        │  fact = t₁               │      └──────────┘
        │  t₂ = db + fact          │
        │  db = t₂                 │
        │  t₃ = i + 1              │
        │  i = t₃                  │
        └──────────────────────────┘
```

Block 1:
$$fact = 1$$
$$db = 0$$
$$i = 1$$

Decision: if ($i > 10$)   — True → Exit,   False →

Decision: if ($fact == 120$)   — True → Exit,   False →

Block:
$$t_1 = fact * i$$
$$fact = t_1$$
$$t_2 = db + fact$$
$$db = t_2$$
$$t_3 = i + 1$$
$$i = t_3$$