Tshwane University of Technology
We empower people

INSTRUCTIONS TO CANDIDATES

1. All exam rules stated by the Tshwane University of Technology apply.
2. **Ensure a single final version of your source code is handed in as requested.**
3. If needed, state all necessary assumptions clearly in code commentary.

MARKS: 100%

PAGES: 13 (incl. cover)

EXAMINER:

Mr A.J. Smith

Mr D. Engelbrecht

Prof J.A. Jordaan

MODERATOR:

Mr T.E. Olivier

TIME:

90 Minutes

(15 Minutes extra time in the event of computer problems)

FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT

DEPARTMENT OF ELECTRICAL ENGINEERING

ES216BB
ENGINEERING SOFTWARE DESIGN B

EVALUATION Makeup

OCTOBER 2025

EVALUATION INSTRUCTIONS

1. **Plagiarism:** Submit only original work. We will use similarity software to verify the authenticity of all submissions.

2. **Permitted Tools:** You are allowed to use only **CodeBlocks** and **Google Chrome** to access the evaluation, view the evaluation PDF and upload your submission for this evaluation. Access to emails, other online resources, and memory sticks is strictly prohibited. Please be aware that computer activity will be remotely monitored. Breaches of TUT's official examination and module rules will result in a minimum penalty of zero for this evaluation, with the potential for further disciplinary action.

3. **File Submission:** Your header code file must be named according to this format: **"<student number>.h" (e.g. 21011022.h).** Do not add any other text (name, surname, etc.) to the file name (ONLY YOUR STUDENT NUMBER).

4. **Uploading Instructions:** **ONLY SUBMIT YOUR HEADER FILE (.h)** via the designated upload link. While multiple uploads are allowed, only the most recent submission will be retained on the system. If you make an error in your initial upload, simply re-upload your file, and the previous version will be overridden.

5. **Evaluation Scope:** This assessment encompasses basic content from ES216AB and specifically ES216BB content defined in **Units 1 to 5**

6. **Programming Language:** Construct your program in **C++** and adhere to structured programming principles.

7. **Editing and Requirements:** Your program must meet all specified requirements. Refer to the attached appendices for additional details.

8. **Evaluation Requirements:**

    a. Remember to save your work on the PC "D: Drive" and save regularly throughout the evaluation.
    b. Do not modify the given code in the ".cpp" file except for changing the header file name to your student number, e.g. "123456789.h".
    c. Do not modify the given libraries and comments in the template ".h" file.
    d. Complete the C++ class definition and functions in each comment block as shown in the template ".h" file.Use the exact function names and parameters as used in the evaluation question paper and given ".cpp" file.

C++ FILE CODE EXPLANATION

The provided C++ file sets up a program that manages a hotel reservation system. It uses a menu interface interacting with the **HotelReservation** class, which allows users to view and manage customer reservations for specific rooms. The system includes functionalities for:

- **Displaying Reservation Details**: Shows the room number, room type, max occupancy, and current number of reservations.
- **Loading Customer Reservations**: Reads customer names from an external text file and adds them to the reservation list.
- **Displaying Guest List**: Prints all names of customers with confirmed reservations.
- **Displaying Reservation Revenue**: Calculates the total revenue based on the room rate and number of reservations.

This system relies on the **HotelReservation** class to manage room data, dynamically store guest information, and compute revenue from room bookings.

CLASS DEFINITION EXPLANATION

The **HotelReservation** class encapsulates the core attributes and behaviour of the reservation system:

- **Private Members:**
    - **RoomNumber** (string): Unique identifier for the room.
    - **RoomType** (string): Type of room (e.g., Standard, Deluxe).
    - **MaxOccupancy** (int): Maximum number of guests allowed.
    - **GuestList** (string*): Dynamically allocated array for storing guest names.
    - **ReservationCount** (int): Tracks the number of confirmed reservations.
- **Public Functions:**
    - **HotelReservation()**: Constructor.
    - **~HotelReservation()**: Destructor.
    - **SetDetails()**: Sets room number, type, and max occupancy.
    - **AddGuest()**: Adds a guest to the room.
    - **DisplayReservationDetails()**: Outputs room details.
    - **DisplayGuestList()**: Displays the list of guests.
    - **ReservationRevenue()**: Computes revenue from bookings.

CLASS FUNCTION EXPLANATIONS

1. Constructor Function

HotelReservation::HotelReservation()

- **Purpose:** Initialises variables to safe defaults.
    - Strings set to empty.
    - Integers set to 0.
    - Pointer set to nullptr.
- **Parameters:** None.
- **Returns:** Nothing (constructor).

---

2. Destructor Function

HotelReservation::~HotelReservation()

- **Purpose:** Frees memory allocated for the GuestList array.
- **Parameters:** None.
- **Returns:** Nothing (destructor).

---

3. Set Details Function

void HotelReservation::SetDetails(string RN, string RT, int MO)

- **Purpose:** Assigns initial values to room attributes.
- **Parameters:**
    - string RN – Room number.
    - string RT – Room type.
    - int MO – Maximum occupancy.
- **Returns:** Nothing.

---

4. Add Guest Function

void HotelReservation::AddGuest(string GuestName)

- **Purpose:** Adds a guest to the list if space is available.
- **Parameters:**
  - string GuestName – Name of the guest.
- **Returns:** Nothing.

---

5. Display Reservation Details Function

void HotelReservation::DisplayReservationDetails()

- **Purpose:** Outputs room number, type, max occupancy, and current number of guests.
- **Parameters:** None.
- **Returns:** Nothing. Outputs to console.

---

6. Display Guest List Function

void HotelReservation::DisplayGuestList()

- **Purpose:** Displays all current guest names or a message if none are reserved.
- **Parameters:** None.
- **Returns:** Nothing. Outputs to console.

---

7. Reservation Revenue Function

float HotelReservation::ReservationRevenue(float RoomRate)

- **Purpose:** Calculates total booking revenue.
  - Formula: ReservationCount * RoomRate
- **Parameters:**
  - float RoomRate – Cost per booking.
- **Returns:**
  - float value – representing total revenue.

PRINT SCREENS

Main Menu:

```
D:\ES216BB_EVMakeup_Main.
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   Hotel Reservation System
   ES216BB
   Evaluation Makeup
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

1. Display Reservation Details
2. Load Guest Reservations
3. Display Guest List
4. Display Reservation Revenue
5. Exit
Choice:
```

Display Hotel Reservation Details:

```
D:\ES216BB_EVMakeup_Main.
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   Hotel Reservation System
   ES216BB
   Evaluation Makeup
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

1. Display Reservation Details
2. Load Guest Reservations
3. Display Guest List
4. Display Reservation Revenue
5. Exit
Choice: 1

Room Number: H205
Room Type: Standard King
Max Occupancy: 12
Current Reservations: 0

Press any key to continue...
```

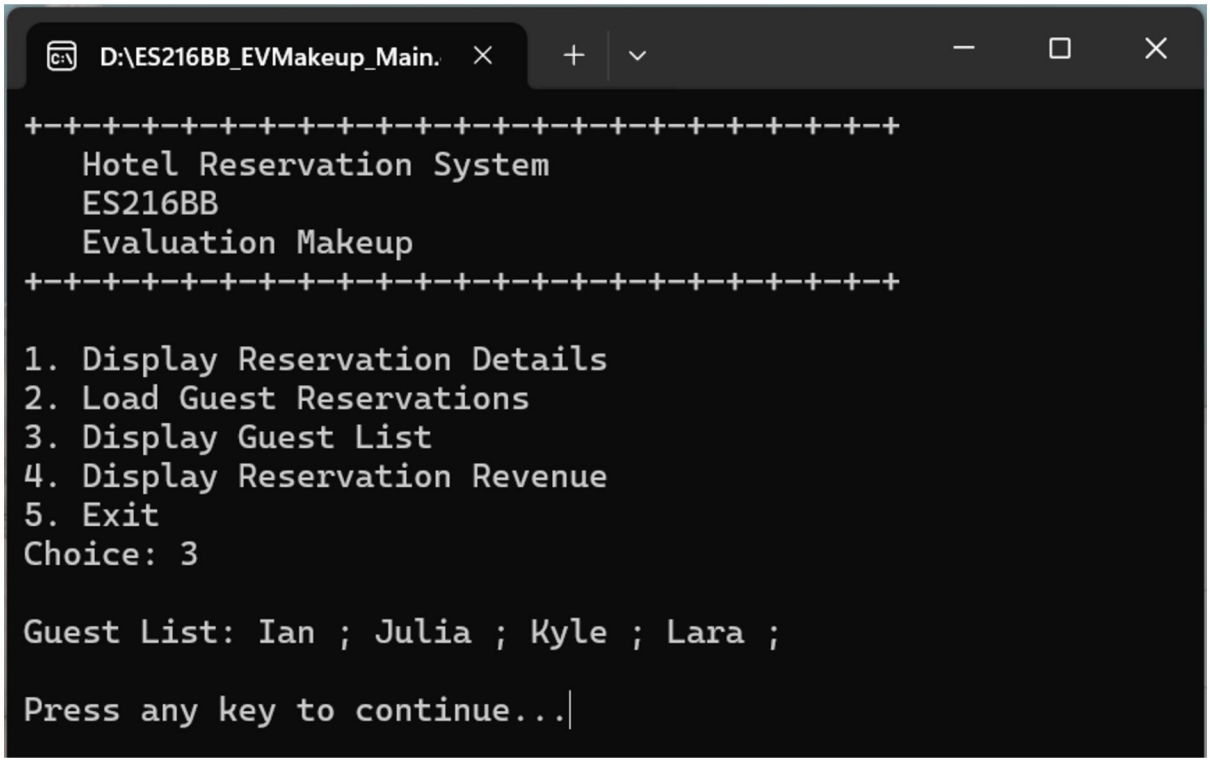
Load Guest Reservation:

```
D:\ES216BB_EVMakeup_Main.

+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   Hotel Reservation System
   ES216BB
   Evaluation Makeup
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

1. Display Reservation Details
2. Load Guest Reservations
3. Display Guest List
4. Display Reservation Revenue
5. Exit
Choice: 2

All possible reservations loaded

Press any key to continue...
```

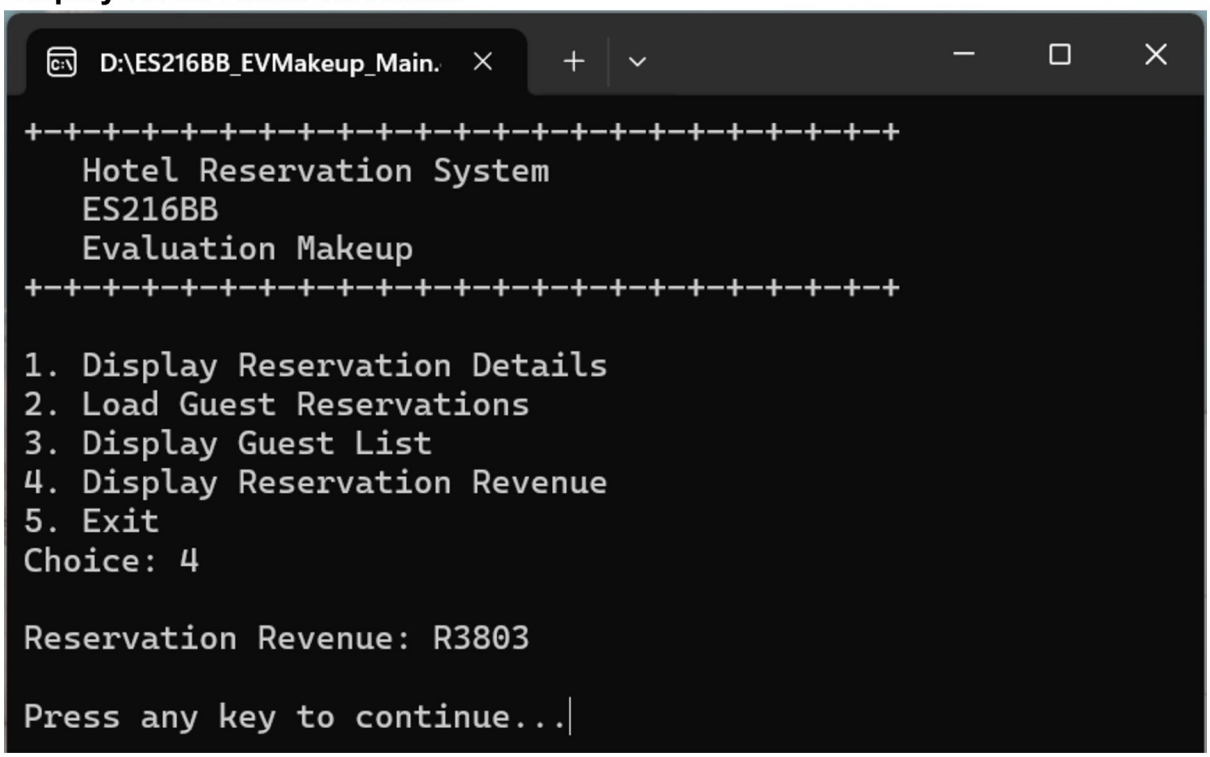
Re-Display Hotel Reservation Details:

```
D:\ES216BB_EVMakeup_Main.

+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   Hotel Reservation System
   ES216BB
   Evaluation Makeup
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

1. Display Reservation Details
2. Load Guest Reservations
3. Display Guest List
4. Display Reservation Revenue
5. Exit
Choice: 1

Room Number: H205
Room Type: Standard King
Max Occupancy: 12
Current Reservations: 4

Press any key to continue...
```

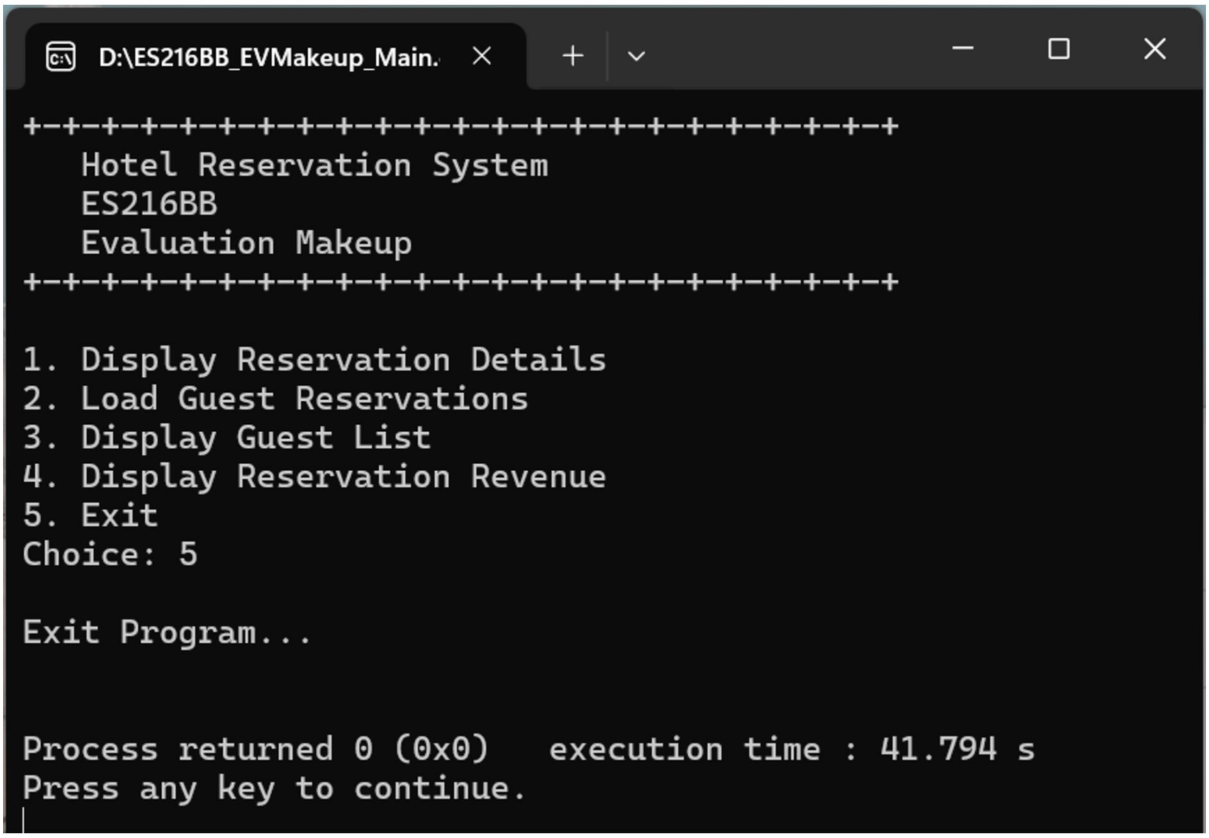
Display Guest List:



Display Reservation Revenue:

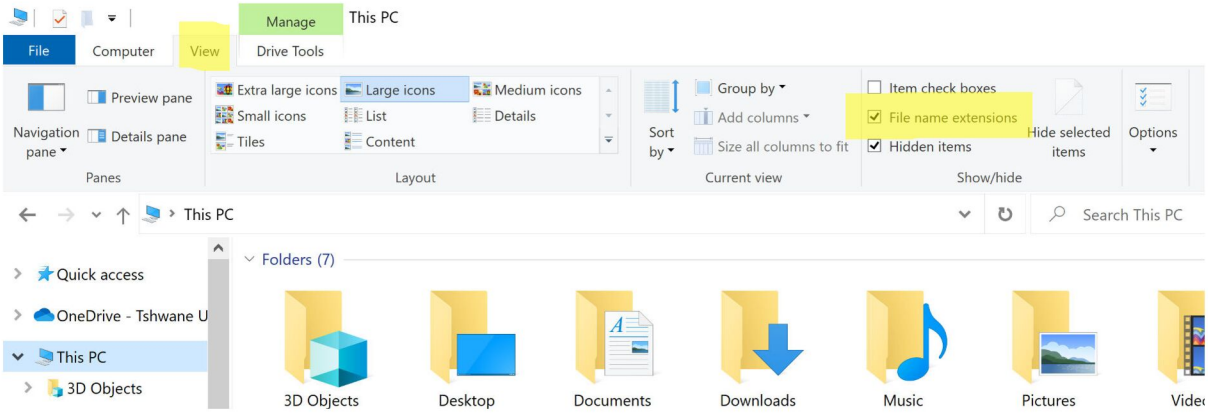


Exit Application:



HOW TO RUN THE SHOWCASE FILE

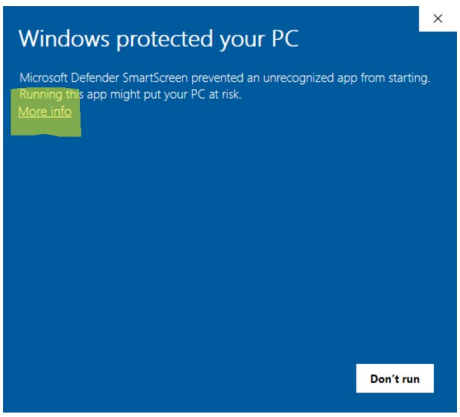
1. Enable file extensions (see highlighted in yellow)



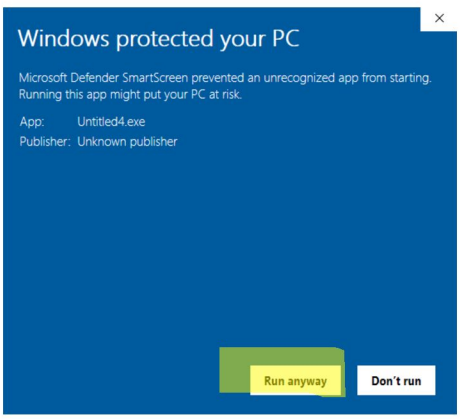
2. Change the name from **"Showcase.old"** to **"Showcase.exe"**

3. Run the **"ShowcaseEV.exe"** by double-clicking on the icon.

4. Windows may show the following. Click on **"More info"**



5. Click on **"Run anyway"**



ANNEXURE A – MARK ALLOCATION

Note: Score range is 0 - 4 which is: 0-none, 1-poor, 2-average, 3-good, 4-excellent

TEST RUBRIC	SCORE [0-4]	WEIGHT [%]
C++ CODE EVALUATION		**50+2**
0. Class Definition		**6**
1. Class Constructor Function		**4**
2. Class Destructor Function		**4**
3. Set Details Function		**5**
4. Add Function		**8**
5. Display Details Function		**5**
6. Display List Function		**5**
7. Profit Function		**5**
8. Overall Impression		**5**
9. No Compile or Runtime Errors		**5**
TOTAL		**50**

Graduate Attribute	GA Number	GA Score [0-5]
Application of scientific and engineering knowledge	GA2	4,7
Engineering methods, skills, tools, including information technology	GA5	0,1,2,3
Impact of Engineering Activity	GA7	5,6
Engineering Professionalism	GA10	8,9

ANNEXURE B – INFORMATION SHEET

Data types: void, char, short, int, float, double
Data Type modifiers: const, auto, static, unsigned, signed
Arithmetic operators: * / % + -
Relational operators: < <= > >= == !=
Assignment operator: = += -= *= /= %= &= ^= |= <<= >>=
Logic operators: && || !
Bitwise logic operators: & | ^ ~ << >>
Pointer operators: Derefernce: * Address: &
Control Structures:

- **IF** Selection: if (condition) { … };
- **IF ELSE** Selection: if (condition) { … } else { … };
- **WHILE** Loop: while (condition) { … };
- **DO WHILE** loop: do { … } while (condition);
- **FOR** Loop: for (initial value of control variable; loop condition; increment of control variable) { … }
- **SWITCH** Selection: switch (control variable){ case 'value': … ; break; default: … ; break; }

Functions: return_data_type function_name (parameters) { … };
Common Library Functions: printf() , scanf() , rand() , srand() , time() , isalpha() , isdigit() , getchar() , getch(), strcpy()
Arrays:

- One dimensional: data_type variable_name[size];
- Two dimensional: data_type variable_name [x_size][y_size];

ANNEXURE C – ASCII TABLE

Dec	Hx	Oct	Char	Dec	Hx	Oct	Html	Chr	Dec	Hx	Oct	Html	Chr	Dec	Hx	Oct	Html	Chr
0	0	000	NUL (null)	32	20	040		Space	64	40	100	@	@	96	60	140	`	`
1	1	001	SOH (start of heading)	33	21	041	!	!	65	41	101	A	A	97	61	141	a	a
2	2	002	STX (start of text)	34	22	042	"	"	66	42	102	B	B	98	62	142	b	b
3	3	003	ETX (end of text)	35	23	043	#	#	67	43	103	C	C	99	63	143	c	c
4	4	004	EOT (end of transmission)	36	24	044	$	$	68	44	104	D	D	100	64	144	d	d
5	5	005	ENQ (enquiry)	37	25	045	%	%	69	45	105	E	E	101	65	145	e	e
6	6	006	ACK (acknowledge)	38	26	046	&	&	70	46	106	F	F	102	66	146	f	f
7	7	007	BEL (bell)	39	27	047	'	'	71	47	107	G	G	103	67	147	g	g
8	8	010	BS (backspace)	40	28	050	(	(	72	48	110	H	H	104	68	150	h	h
9	9	011	TAB (horizontal tab)	41	29	051	)	)	73	49	111	I	I	105	69	151	i	i
10	A	012	LF (NL line feed, new line)	42	2A	052	*	*	74	4A	112	J	J	106	6A	152	j	j
11	B	013	VT (vertical tab)	43	2B	053	+	+	75	4B	113	K	K	107	6B	153	k	k
12	C	014	FF (NP form feed, new page)	44	2C	054	,	,	76	4C	114	L	L	108	6C	154	l	l
13	D	015	CR (carriage return)	45	2D	055	-	-	77	4D	115	M	M	109	6D	155	m	m
14	E	016	SO (shift out)	46	2E	056	.	.	78	4E	116	N	N	110	6E	156	n	n
15	F	017	SI (shift in)	47	2F	057	/	/	79	4F	117	O	O	111	6F	157	o	o
16	10	020	DLE (data link escape)	48	30	060	0	0	80	50	120	P	P	112	70	160	p	p
17	11	021	DC1 (device control 1)	49	31	061	1	1	81	51	121	Q	Q	113	71	161	q	q
18	12	022	DC2 (device control 2)	50	32	062	2	2	82	52	122	R	R	114	72	162	r	r
19	13	023	DC3 (device control 3)	51	33	063	3	3	83	53	123	S	S	115	73	163	s	s
20	14	024	DC4 (device control 4)	52	34	064	4	4	84	54	124	T	T	116	74	164	t	t
21	15	025	NAK (negative acknowledge)	53	35	065	5	5	85	55	125	U	U	117	75	165	u	u
22	16	026	SYN (synchronous idle)	54	36	066	6	6	86	56	126	V	V	118	76	166	v	v
23	17	027	ETB (end of trans. block)	55	37	067	7	7	87	57	127	W	W	119	77	167	w	w
24	18	030	CAN (cancel)	56	38	070	8	8	88	58	130	X	X	120	78	170	x	x
25	19	031	EM (end of medium)	57	39	071	9	9	89	59	131	Y	Y	121	79	171	y	y
26	1A	032	SUB (substitute)	58	3A	072	:	:	90	5A	132	Z	Z	122	7A	172	z	z
27	1B	033	ESC (escape)	59	3B	073	;	;	91	5B	133	[	[	123	7B	173	{	{
28	1C	034	FS (file separator)	60	3C	074	<	<	92	5C	134	\	\	124	7C	174			|
29	1D	035	GS (group separator)	61	3D	075	=	=	93	5D	135	]	]	125	7D	175	}	}
30	1E	036	RS (record separator)	62	3E	076	>	>	94	5E	136	^	^	126	7E	176	~	~
31	1F	037	US (unit separator)	63	3F	077	?	?	95	5F	137	_	_	127	7F	177	&#127;	DEL

Source: www.LookupTables.com